

**Spiralling out of control? Online  
vulnerability in ego-centric networks.**

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## **Abstract**

Online social network sites (SNS) are a ubiquitous method of socialising in the digital era. A potential source of social support, their continued and frequent use has been linked to a fear of missing out (FOMO) and the implicit desire to regulate offline psychological needs deficits through online connective behaviours. This thesis provides an examination of the online vulnerability implications associated with social networking. A multi-methods approach was used combining self-report surveys with digitally derived data from participants' online networks. Participants were sampled by age-group (adolescents, university students, and adults), rendering an overall sample of 506 (53% male; 13 to 77 years) UK based Facebook users, from which subsequent study-specific datasets were derived. Data were analysed using confirmatory factor analysis, structural equation modelling, mediation analysis, multilevel modelling, and social network analysis. The results indicate that: (1) FOMO and online connective behaviours mediate the relationship between offline psychological vulnerability and exposure to negative online experiences; (2) offline vulnerabilities have the capacity to initiate a cycle of potentially problematic online behaviour; (3) maintaining a large, diverse network of social connections is associated with higher levels of reported exposure to negative online experiences; (4) the presence of certain types of individuals / online entities might be associated with an individual experiencing negative online experiences, and (5) adult users might be less likely to perceive themselves as vulnerable to negative online experiences when compared to adolescent users. The research contributes to knowledge and understanding of online life by providing a digitally enhanced perspective of the implications that offline psycho-social motivations, online behaviours, and user characteristics can have on an individual's vulnerability to negative online experiences.

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## **Chapter 1: Introduction to thesis**

### *1.1. Chapter introduction*

In an increasingly connected world, online SNS provide interactive platforms for the digitally enabled to develop and manage their social spheres. Surpassing the predominantly text-based methods of early computer-mediated communication, these sites afford users the ability to share a vast array of information in multimedia-rich environments. For the millions of global users who regularly engage with these sites (Ofcom, 2014), it has been suggested that they provide an online equivalent to face-to-face communication contexts (Underwood, Kerlin, & Farrington-Flint, 2011), and in doing so carry the potential of delivering a range of social and psychological benefits (Burke & Kraut, 2014; Ellison, Steinfield & Lampe, 2007; Valkenburg, Peter, & Schouten, 2006). At the same time, an area of mounting academic interest is in addressing an individual's susceptibility to potentially detrimental experiences when using SNS to interact and communicate with social connections online (Debatin, Lovejoy, Horn, & Hughes, 2009; Fogel & Nehmad, 2009; Wilcox & Stephen, 2013). The research presented in this thesis addresses factors that might contribute to an individual's perception of and/or their actual susceptibility to negative online experiences in the context of UK SNS users. Chapter 1 introduces the thesis with a review of the literature considering the motivations, opportunities, and experiences that have been associated with reasons for SNS use. The chapter considers the 'expected' uses and gratifications that an individual might hope to gain from engaging in certain SNS behaviours, before introducing the notion that some outcomes and behaviours experienced on the site might be more 'unexpected' and potentially detrimental to the individual user. The chapter then presents the overarching aim of the research and provides a brief overview of the

methodology and design employed in this thesis. Finally, the chapter ends with an outline of the remaining nine chapters of the thesis.

### *1.2. Theoretical overview*

Early research into online social interactions centred on the use of computer mediated communication (CMC) technologies (Kraut et al., 1998; Kraut et al., 2002; Mesch, 2001; Whitty, 2002). Such technologies provided a largely text-based means of communicating with individuals via internet-based platforms such as chat rooms (e.g., AOL), instant messengers (e.g., ICQ and AIM), and email. As internet enabled technologies have developed, so too have the opportunities for digitally enabled individuals to communicate, develop, and manage their social spheres online and share a vast array of information in multimedia rich SNS environments.

boyd and Ellison (2008) define SNS as web-based services that enable individual online users to:

- 1) Create a public or semi-public profile within a specified platform,
- 2) Articulate a list of site users with whom they share a connection, and
- 3) View or navigate their list of connections and the connections of others within the system.

The emergence of modern SNS have encapsulated not only the traditional text-based formats of earlier computer mediated communication, but also the use of speech, video, and photographic capabilities and in so doing offer their users a whole host of opportunities to enhance their online social interactions.

SNS, in their present form, came to prominence in Western society at the turn of the millennium with the emergence of the short-lived platform sixdegrees.com in 1997, which offered users the opportunity to list their connections and post messages on bulletin boards. The emergence of SNS, encouraged users to move away from the predominantly anonymous forms of communication often associated with CMC, and instead provided a means of connecting and interacting with known individuals from both offline and online social domains. Sixdegrees.com paved the way for a multitude of different incarnations of SNS including (but certainly not limited to) FriendsReunited.com in 2000, Friendster.com in 2002, Myspace and LinkedIn in 2003, Facebook in 2004, Twitter in 2006, Instagram in 2010, and most recently Google+ and Snapchat in 2011. In the past decade, SNS usage has become a global phenomenon with approximately 2.04 billion worldwide users (Statista, 2016). In the UK and USA, it is estimated that over 75% of internet using adults and teenagers regularly maintain at least one SNS profile (Ofcom, 2015<sub>ab</sub>; Pew Research, 2015<sub>ab</sub>), with upward usage trends evident in digitised nations globally (We Are Social, 2015). For the global users who regularly engage with these sites, it has been suggested that they provide an online equivalent to face to face communication contexts (Underwood et al., 2011), and in doing so present a plethora of potentially beneficial social and psychological opportunities (Ellison et al., 2007; Valkenburg et al., 2006). An area of mounting academic interest, however, is in addressing the ways in which users encounter and/or engage in potentially detrimental experiences when using SNS to interact and communicate with social connections online (Debatin et al., 2009; Wilcox & Stephen, 2013). The present thesis looks to address the possible associations between an individual's offline psycho-social characteristics, use of SNS, and

potentially detrimental experiences by considering a specific form of SNS: Ego-centric SNS.

### *1.2.1 Ego-centric online SNS*

An ego-centric SNS, as exemplified by Facebook and LinkedIn, assumes that the profile owner (the ego) is at the centre of a personal network and that all other connections within that network are connected to the ego (Arnaboldi, Guazzini, & Passerella, 2013). Ego-centric SNS are based on reciprocal online connections. For this reason they have been said to promote the augmentation and reinforcement of offline friendship formation and maintenance habits (Underwood et al., 2011) with individuals utilising online profile information to assess prospective online connections against traditional notions of mutual trust and common interests (Thelwall, 2008).

To connect to another user from the wider public network, the ego-user must enter into a mutually agreed online connection facilitated through the sending and receiving of connection requests (e.g., ‘friend requests’ on Facebook). Once connected individuals can view the full content (user defined privacy settings permitting) of their mutual connections’ profile and communicate with them freely. While individuals using ego-centric SNS have the capability to share vast amounts of personal information through their profiles, the relatively closed nature of the network facilitates a greater capacity to control and to some extent inhibits the flow of information to their mutual connections.

Facebook, founded in 2004 by Mark Zuckerberg and colleagues, is a prime example of an ego-centric online network in action. Facebook is essentially a collection of

interconnected ego-centric networks (Hogan, 2008), with each individual user at the centre of their own personal mini-network within the global Facebook community. Originally intended as a means of communicating between college students (Markoff, 2007), Facebook has rapidly permeated society having been adopted by users across the lifespan (Hutto et al., 2015; Ofcom, 2015<sub>b</sub>; Pew Research, 2014; Pew Research, 2015<sub>b</sub>). Facebook encourages users to engage with offline connections online, providing researchers with a useful platform to study the interplay between the offline and online domains. Furthermore, Facebook is currently the most popular ego-centric SNS in the western world (Ofcom, 2015<sub>ab</sub>; Pew Research, 2015<sub>ab</sub>), with in excess of 1.65 billion active profiles and 989 million daily users (Facebook, 2016). In the UK alone, it is estimated that 87% of adolescents and 97% of adults with social media profiles use Facebook, with 8 out of 10 adult users stating that the site maintains their primary SNS profile (Ofcom, 2015<sub>ab</sub>). Over and above the popularity of the site, the Facebook platform also provides a unique opportunity for both SNS users and researchers to access digital communication data via the Facebook API (Application Programmer Interface). The Facebook API facilitates the retrieval of digitally derived information, such as mutual friendship lists, that can be used in social network analysis (SNA). At present, such a feature is not yet readily available on other mainstream SNS. Based on Facebook's ability to facilitate the collection of digitally derived data and its current popularity with users, being the SNS of choice for many users young and old, the platform is used as the main point of reference for the research conducted in this thesis. It should be noted however, that the theories and concepts outlined will be broadly attributable to any similarly structured ego-centric online SNS.

### *1.2.2 Who uses Facebook?*

In the UK, there are over 30 million active Facebook users of which 52% are female and most are aged between 16 and 24 years old (Statista, 2016). Similar demographic patterns are also evident in the USA (Pew Research, 2015<sub>b</sub>). It is therefore, no surprise that a great deal of research has focussed on older adolescent or college aged users (e.g., Christofides, Muise, & Desmarais, 2009; Davidson & Martellozzo, 2013; Livingstone, Ólafsson, & Staksrud, 2013; Staksrud, Ólafsson, & Livingstone, 2013). Recently however, there has been a surge in users aged over 30 (Wilson, Gosling, & Graham, 2012) and evidence of increasing popularity amongst older generations (Hutto et al., 2015; Ofcom, 2015<sub>b</sub>; Pew Research, 2014). As such, researchers have been encouraged to encompass a wider age range of users in their efforts to identify key facets of Facebook use (Wilson et al., 2012). The current thesis will heed this advice by sampling SNS users from adolescents to older adults.

Research into general cross-generational Facebook use and habits has been conducted. A study by McAndrew and Jeong (2012) of 1026 worldwide Facebook users (18 – 79 years) found that young female users spent more time online, had larger networks of contacts, and were more likely to post photographs than male users or their older counterparts. Furthermore, a study by Ozimek and Bierhoff (2016) of 335 European Facebook users aged between 16 and 56 years demonstrated that increased activity (e.g., social interactions, posting pictures, and engaging in social comparison) on SNS, such as Facebook, are more apparent amongst younger users. However, research addressing Facebook use and potential detrimental online experiences spanning the lifespan is at present somewhat lacking. The present thesis will seek to bridge this gap in the literature by considering a mixed-gender sample of UK based Facebook users from across different generations in an attempt to gain a more considered perspective

of different individuals' motivations, online behaviours, and potential consequences of engaging with Facebook.

In addition to the general demographics of Facebook users, some researchers have used personality factors (e.g., extraversion) to predict who and why some individuals might engage with SNS platforms (Amichai-Hamburger & Vinitzky, 2010; Bibby, 2008; Ross et al., 2009). However, such studies have been known to produce mixed or contradicting results, leading to suggestions that a user's offline psycho-social motivations (e.g., self-esteem) for SNS engagement may be of greater importance in explaining user behaviours and activities online (Mehdizadeh, 2010; Seidman, 2013). In the following section, use of Facebook is considered from a psycho-social motivations perspective.

### *1.2.3 Why do people use Facebook?*

In the offline world, social networks provide a range of psycho-social benefits, including access to social and emotional support, sources of information, and the ability to foster relationship ties with others (Berkman & Glass, 2000). As relationships and networks are increasingly maintained online, use of SNS platforms such as Facebook, afford individuals the potential to access such perceived offline benefits online (Joinson, 2008). Facebook provides individuals with a range of opportunities to forge and maintain their social networks (Masur, Reinecke, Ziegele, & Quiring, 2014), share information about their daily lives, feelings and interests (in the form of text, photographs and video), seek information (from individuals, groups, and pages), and communicate with others (via wall posts or direct messages). In doing so, use of Facebook has been said to enable individuals to seek and fulfil a range of social and psychological needs (Joinson, 2008; Papacharissi & Mendelson, 2010).



There has been a tendency in technology-focussed psychological research to adopt a deterministic stance, with studies attempting to infer direct causality between the use of a specific technology or application and some behavioural or psychological effect (Dwyer, Hiltz, & Passerini, 2007; Kraut et al., 1998). Technology use, however, does not lend itself to such a simplistic approach, with researchers such as McKenna and Bargh (2000) suggesting that there may in fact be no straightforward direct effect of technology use. An alternative to this drive towards direct ‘effects’ is to consider technology use from a more holistic research perspective. Drawing on Kling’s (2007) work on social informatics, Ahn (2011) suggests, researchers should not seek to hold a technology, such as SNS, fully accountable for a user’s experiences and wellbeing, but instead consider how the technology facilitates a user’s expectations, behaviours, and outcomes in relation to potential sources of social and psychological motivation.

Indeed, research has indicated that user strategies on Facebook vary across individuals with suggestions that different users engage with and use the site for different reasons (Burke, Kraut, & Marlow, 2011; Lampe, Ellison, & Steinfield, 2008). Individual motivations for Facebook use are therefore an important consideration for research into the platform and indeed this thesis. This section will provide an overview of some of the key social and psychological motivations associated with Facebook use. Starting with an outline of general motivation theories (e.g., Maslow, 1943; Ryan & Deci, 2000), Facebook motivations will then be considered from the perspective of the Uses and Gratifications framework (U&G; Katz, Blumler, & Gurevitch, 1974) in an attempt to provide an overview of some of the potential reasons for use and perceived benefits that the platform can provide.

#### *1.2.3.1 Motivations for Facebook use*

Motivation is a construct used to describe an individual's desires in relation to their intention to behave. More specifically, it has been defined as "*the degree to which an individual wants and chooses to engage in certain specified behaviours*" (Mitchell, 1982, p.82). The field of motivation research is abundant with theories. An early, but still widely used, theory is the *Theory of Human Motivation* developed by Abraham Maslow (1943). In his theory, Maslow identified five basic needs of human motivation: physiological (the need to sustain physical wellbeing); safety (the need to gain health, family and job security); belonging (the need for friendship, family and love); esteem (the need to be respected); and self-actualisation (the need to achieve one's potential). Better known as the 'hierarchy of needs,' Maslow theorised that humans possessed an innate desire to 'self-actualise' and would be motivated to engage in behaviours that would allow them to seek out opportunities to fulfil each level of need in order, from lower (physiological) to higher (self-actualisation), to achieve their life goals. Maslow's theory, whilst a classic, is however not without criticism (Kellerman, 2014). Critics have highlighted how the rigidity of the hierarchy does not allow for individual differences in human behaviour, nor does it adequately reflect the potential influence of social and environmental factors (Hendriks, 1999; Mitchell, 1982; Neher, 1991). Such criticism however, has not deterred some researchers from using it to investigate motivations of continued use of Facebook (Cao et al., 2013).

A motivational theory that has resonated with researchers in the realms of cyber-social psychology is that of self-determination theory (SDT; Ryan & Deci, 2000). Based on the intrinsic (engaging in an activity/behaviour for satisfaction and enjoyment) and extrinsic (engaging in an activity/behaviour as a result of some outward pressure)

motivations model described by Deci and Ryan (1985), the SDT (Ryan & Deci, 2000) suggests that an individual's motivations, behaviours, and subsequent wellbeing are intrinsically linked to three innate psychological needs: autonomy (the need to control one's life course), competence (the need to show effective and meaningful actions when dealing with the environment), and relatedness (the need to feel connected to others and belong). Research has demonstrated that individuals who perceive themselves to be achieving high levels of intrinsic need satisfaction demonstrate a tendency to report positive effects in terms of psycho-social health and wellbeing (Ryan, 1995; Veronneau, Koestner, & Abela, 2005). However, when attempts by an individual to satisfy their needs are thwarted, it has been shown to produce maladaptive psycho-social consequences (Soenens, Vansteenkiste, Luyten, Duriez, & Goossens, 2005).

For individuals who are unable to realise their psycho-social needs in their daily offline lives, interaction with online technologies such as Facebook, has been shown to provide opportunities to regulate and overcome such psycho-social deficits (Masur et al., 2014). Potential associations between such offline deficits and Facebook, have considered the role of self-esteem as a motivational factor for platform use. The term self-esteem refers to the extent to which individuals' view themselves to be worthwhile and competent (Coopersmith, 1967), and is said to encompass both beliefs (e.g., "*I am a competent and successful person*") and emotions, with an individual's self-esteem manifesting itself in feelings of pride and shame (amongst others) in response to daily events and contexts or borne from evaluations of oneself that have developed over time (Heatherton & Polivy, 1991).

Research has indicated that individuals who are low in self-esteem in the offline world, possibly because of intrinsic needs deficits in one or more domains, have been shown

to use SNS as a means of boosting their overall sense of self-worth (Gonzales & Hancock, 2011; Steinfield, Ellison, & Lampe, 2008; Valkenburg et al., 2006). A study by Forest and Wood (2012) looking at the motivations and consequences of SNS use amongst people with low self-esteem showed that for many, sites such as Facebook, presented a 'safe' and appealing place to connect with others and boost their perception of self-worth. As a result, SNS users with low self-esteem in the offline world were found to spend more time online. Furthermore, links between low self-esteem offline and SNS behaviours such as intensity of use and photo sharing have also been demonstrated by the likes of Mehdizadeh (2010) and Stefanone, Lackaff, and Rosen (2011). It would appear then that an individual's self-esteem offline, from the perspective of an individual's thwarted attempt to satisfy an innate need, plays an important motivating role in Facebook use and the behaviours that people exhibit online, a role that will be explored further during the course of this thesis.

The motivating role of offline self-esteem complements SDT, with its emphasis on psycho-social needs regulation, and therefore, offers a potential insight into the motivations regarding use and perceived benefits of Facebook. However, to consider Facebook motivations from a largely intrinsic perspective neglects to acknowledge the potential extrinsic pressures that might be placed upon a user (e.g., social pressure to belong), which in turn might further motivate their behaviours and actions online. Extrinsic motivations have traditionally been used to highlight negative effects in terms of psychological wellbeing and development (Deci & Ryan, 2000). However, more recently it has been suggested that the role of extrinsic motivations in terms of Facebook might be a more mixed one. An online survey study, of 230 Facebook users by Reinecke, Vorderer, and Knop (2014), looking at the role of both intrinsic needs satisfaction and extrinsic motivations, demonstrated that social pressures (in this case

perceived offline peer pressure), were negatively associated with the intrinsic need for autonomy, with Facebook use being regarded as a ‘controlled’ necessity rather than a source of enjoyment. However, intrinsic competence and relatedness were deemed to benefit from social pressures, in that users gained higher levels of social interaction, belonging and positive social feedback when engaging with others on the network.

#### *1.2.3.1.1 Extrinsic motivations and Facebook*

The role of extrinsic social motivations in psycho-social needs fulfilment draws parallels with theories of social ostracism (Gilbert et al., 2007; Williams, 2009). These are motivational theories that consider the psycho-social and behavioural effects associated with the perceived threat of feeling ‘left out’ of the social spheres in which an individual resides or aspires to belong. In both the offline and online world, individuals can perceive extrinsic threats to their ‘belonging’ by engaging in social comparisons with others.

Social comparison theory, outlined by Festinger (1954), postulates that an individual will evaluate their attitudes, behaviours, and abilities by comparing themselves to others. In so doing, individuals can use these comparisons to serve a variety of psycho-social purposes, including evaluating the self (Festinger, 1954), evaluating group affiliations (Schachter, 1959), and regulating emotions and well-being (Taylor & Brown, 1988; Tesser & Campbell, 1982). Social comparisons with others can be directed in both an upward and downward fashion (Wills, 1981). When an individual makes an upward comparison, they are seen to compare themselves against others who are perceived to be superior to themselves and display more positive characteristics. In contrast, a downward comparison occurs when an individual compares themselves to others who are deemed inferior. A downward social comparison is akin to a

defensive strategy in that the individual uses the downward evaluations as a means of boosting their own sense of wellbeing and self-worth (Wills, 1981). Upward social comparisons can also provide individuals with benefits, for instance, they can motivate and inspire people to make positive changes in their lives (Lockwood & Kunda, 1997). At the same time, evaluating oneself against the perceptually ‘superior’ lives of others can be rather detrimental with individuals gaining a sense of inadequacy, low self-esteem, and social pressure to conform (Marsh & Parker, 1984; Pyszczynski, Greenberg, & LaPrelle, 1985).

#### *1.2.3.1.2 The fear of missing out*

Frequent upward social comparisons can elicit a fear of missing out (FOMO), a form of social anxiety in which individuals perceive others to be more socially competent and interesting than themselves, and lead to negative detriments in perceptions of psycho-social needs. Recent research has suggested FOMO can be a psychological motivator, driving people to seek out opportunities to regulate their psycho-social needs and wellbeing (Przybylski, Murayama, DeHaan, & Gladwell, 2013). On Facebook, such regulation can be achieved by engaging in online behaviours such as online friending and self-disclosure (Tobin, Vanman, Verreynne, & Saeri, 2015) and seeking out others as targets for downward comparisons. As such, FOMO has been found to be positively associated with an individual’s frequent engagement with the site (Baker, Krieger, & LeRoy, 2016; Beyens, Frison, & Eggermont, 2016; Przybylski et al., 2013). However, as Przybylski et al. (2013) warn, FOMO in the context of SNS use has the capacity to produce a “*self-regulatory limbo*” (p.1842), with individuals seeking to reaffirm their identity and sense of belonging by spending more and more time online. However, more time online provides users with increased opportunity to

make social comparisons, which in an upward direction could lead in turn to further fears of missing out and subsequently to more social networking engagement and behaviours.

A theory that can help to explain this potential “*self-regulatory limbo*” is the *Temporal Needs-Threat Model of Social Ostracism* by Williams (2009) which suggests that individuals fearing social ostracism (feeling excluded / left out) are likely to compensate for a lack of perceived wellbeing by looking for opportunities to increase their sense of autonomy, competence, and relatedness. The model suggests that individuals go through a three-stage process of managing the perceived threat. When an individual identifies a potential threat of ostracism they enter the first ‘reflexive’ stage, in which an innate need to boost their self-esteem triggers a desire to balance their psycho-social needs. In the second ‘reflective’ stage, individuals then attend to these needs by attempting to make themselves more socially attractive and gain recognition. Finally, in the third ‘resignation’ stage, should an individual perceive that their needs have been unsuccessfully addressed, or indeed they detect further threats of social ostracism, individuals might once again experience deficits in their overall psychological wellbeing, potentially triggering a cycle of behaviour in which individuals are motivated to increase their attempts to readdress the balancing of their needs.

The impact of FOMO, and it’s potential to trigger a spiral of increasing SNS use and related behaviours, is said to be most profound in individuals who already exhibit deficits in their needs satisfaction and self-esteem (Przybylski et al., 2013). For this reason, it has been suggested that FOMO might mediate the association between psycho-social deficits and Facebook use. However, at present a clear understanding of how this psycho-socially motivated SNS use affects specific online behaviours and

outcomes is lacking. The mediating role of FOMO, in the relationship between offline self-esteem and an individual's online behaviours, will be further explored in this thesis.

The literature on motivations has so far has indicated that in terms of psycho-social need fulfilment, Facebook would seem to offer a range of intrinsic and extrinsic opportunities in terms of both use of the site and the gratifications it can provide. Such motivations indicate that users of Facebook perceive the site to be a useful resource in their quest to regulate their needs. In the following section, some of these perceived uses and gratifications will be explored in more depth to provide a clearer picture of not only why individuals choose to engage with Facebook but also what they expect to gain from this engagement.

#### *1.2.3.2 The perceived 'usefulness' of Facebook*

Introduced by Katz et al. in 1974, U&G theory offers a means of explaining the motives, needs, and gratifications that are associated with media use, allowing researchers to consider the *“social and psychological origins of needs, which generate expectations of the mass media or other sources, which lead to differential patterns of media exposure (or engagement in other activities) resulting in need gratifications and other consequences, perhaps mostly unintended ones”* (Katz et al., 1974, p. 510).

At the core of U&G theory is the belief that individuals are active users and consumers of media, and intentionally select media that afford them with the opportunity to gratify their psychological needs and motivations (Katz et al., 1974). Forms of media have expanded and seen major technological developments since the inception of the original theory, nevertheless it has been adopted, but indeed adapted, by many SNS



researchers in the field (Hunt, Atkin, & Krishnan, 2012; Joinson, 2008; Papcharassi & Mendelson, 2001; Sheldon, 2008).

Numerous studies addressing the uses and gratifications of Facebook users have sought to explain site engagement using the U&G framework. A study by Smock, Ellison, Lampe, and Wohn (2011) examined a range of different uses and gratifications related to Facebook feature use with a sample of 267 university students, including entertainment, social interaction, expressive information sharing, companionship, peer influence, professional advancement, and the passing of time. While all perceived uses and gratifications were to some extent implicated in a user's Facebook engagement, the most marked predictor was found to be social interaction. Similar findings have also been evidenced in other U&G studies such as Park, Kee, and Valenzuela (2009) who identified four primary domains of uses and gratifications (socialising, entertainment, self-status seeking, and information seeking) associated with interacting with Facebook groups, and Leung (2013) who identified a need in social media users to gain sociability and recognition.

In line with the motivation theories previously discussed (see Section 1.2.3.1, p.25) and evidence from U&G studies, it would therefore appear that a prime perceived use of Facebook is to satisfy users' psycho-social needs via online social interaction (Barker, 2009; Joinson, 2008; Quan-Haase & Young, 2010). Social interaction is indicative of an individual's need to belong and feel connected, and gain approval from others (Cho & Jun, 2016). As Baumeister and Leary (1995) state, the need to belong and gain acceptance from others is a "*fundamental human motivation that is something all human beings possess ... to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships*" (p. 497).

On Facebook, users can fulfil this need through their ability to connect with and interact with others on the network and share information. In this way, Facebook presents a valuable platform for users to accumulate and maintain social capital (Burke, Marlow, & Lento, 2010; Burke et al., 2011; Ellison et al., 2007; Valenzuela, Park, & Kee, 2009) and gain social acceptance and belonging (Yu, Tian, Vogel, & Kwok, 2010). In doing so, Facebook users aim to fulfil their need for autonomy, competence, and relatedness and thus increase their overall sense of psychological wellbeing (Gonzales & Hancock, 2011; Steinfield et al., 2008).

#### *1.2.3.2.1 Expected 'consequences' of Facebook Use*

Humans are highly dependent on the social, emotional, and informational support they receive from others (Baumeister & Leary, 1995). Gaining such support has the capacity to increase an individual's sense of belonging, self-efficacy, and self-worth, and in doing so foster potential benefits in terms of their innate psychological needs. A way in which individuals can acquire this support is through the accumulation and maintenance of social capital. The term social capital is widely used in the realms of social, political, and psychological research. At the heart of social capital is the idea that individuals will accrue a range of benefits and resources as a result of the social interactions they have with others (Portes, 1998; Lin, 1999). Resources that are shared in such interactions can take many forms including access to helpful information, and social and emotional support. The accumulation of social capital has been associated with largely positive outcomes in the offline world, including reported increases in health and wellbeing (Bjørnskov, 2003; Helliwell, 2006) and prosocial behaviour (Wright, Cullen, & Miller, 2001).

A wide range of interpretations of social capital have been offered by researchers and theorists over time. The French sociologist Pierre Bourdieu (1986) theorised that capital should be considered in terms of economic capital, cultural capital, and social capital, which Bourdieu (1986) defined as “*the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition*” (p. 248). Bourdieu highlighted how the type and purpose of resources gained from such social relationships might differ. He also suggested how an individual’s ability to gain social capital might be linked to the notion of symbolic capital, a form of capital that can be accumulated by an individual based on the reputation they have amongst their social connections. Bourdieu described it more formally as “*the acquisition of a reputation for competence and an image of respectability and honourability...*” (1984, p. 291). While the idea of symbolic capital still resonates in the realms of research today (particularly online), as a general theory of social capital, Bourdieu has been accused of presenting a rather negative outlook on an individual’s ability to acquire capital by implying that it is bound by social hierarchies favouring the elite (Gauntlett, 2011).

Alternative theories of social capital suggest that it is not necessarily group (or class) membership that will determine the quantity and quality of the resources available, with greater emphasis placed on the nature and characteristics of the actual relationships people engage in, and the ability of an individual to form and maintain those relationships. One such theory is presented by Coleman (2000) who describes social capital as resources accumulated through relationships among people that can be facilitated by individual or collective action, and thus generated by networks of relationships, reciprocity, trust, and social norms. In a similar vein, Lin (1999) suggests that social capital can be optimised through the development of social

networks from which individuals can gain increased levels of “*access to and use of resources*” (p. 30).

The myriad of definitions and somewhat overuse of the term social capital have led some researchers, most notably in the domain of social networks, to question the usefulness of a concept deemed to be overly general and somewhat artificial (Kadushin, 2004; Fine, 2018). Some would argue that in today’s digitally driven society, consideration of the structural features of a network and the characteristics of those involved can provide a better insight into the social capital that might be on offer online and hence provide a more up to date perspective on the differences in perceived and actual outcomes derived from the social resources people access online (Brooks, Hogan, Ellison, Lampe, & Vitak, 2014). Building on a largely self-reported evidence base, the present thesis will consider these structures and characteristics from a digital perspective.

Interest in the nature and characteristics of the social relations involved in providing social capital has led to the identification of two related groups of social capital: bonding capital and bridging capital (Putnam, 2000). Bonding capital refers to the social capital accrued from close-knit social relationships such as those with close friends and family and is said to provide individuals with access to emotional and social support (Stefanone, Kwon, & Lackaff, 2012; Williams, 2006). It should be noted that bridging capital has been presented in previous research (Putnam, 2000; Williams, 2006) as a community level concept (i.e., based on an individual’s participation in a broader group). However, in line with research by Steinfield and colleagues (2008) this thesis considers the distinction from an individual and relationship level (i.e., an individual’s ability to maximise capital gain from their connections). In this context, bridging capital refers to social capital gained as a result

of interactions with looser ties such as casual acquaintances and friends of friends (Adler & Kwon, 2002). Bridging capital is often described as ‘linkage capital’ in that it allows for diverse groups of individuals, who otherwise would not be connected, to connect and gain access to novel information and social resources (Ellison et al., 2007). The notion that individuals with relatively loose connections can provide beneficial social capital complements Granovetter’s (1977) work on ‘the strength of weak ties’, which suggested that weak ties in a social network were likely to provide access to a range of information not readily available to the individual from their closer ‘bonded’ ties.

Tie strength has formed an important role in technology related social capital research. Indeed, Wellman, Haase, Witte, and Hampton (2001) suggested that internet technologies are well suited to the accumulation of both bonding and bridging capital due to the increased opportunities available to users to connect to others from diverse social spheres. Furthermore, the work of Williams (2006), drawing heavily on the work of Putnam (2001), has addressed the increasing use of internet enabled communication technologies with the development of scales to capture bonding and bridging social capital from the perspective of an individual’s access to resources. Williams’ scales did not address the ‘actual’ social capital an individual might accrue, but rather ‘perceived’ social capital, i.e., how much capital an individual thought they had access to, with the aim of comparing these perceptions of social capital in both an online and offline context.

Research on SNS, often utilising the work of Williams (2006), has indicated that sites such as Facebook provide users with the opportunity to foster higher rates of perceived social capital in both online and offline relationships (Burke et al., 2011; Donath & boyd 2004; Ellison, et al., 2007; Papacharissi & Mendelson, 2010; Valenzuela et al.,

2009). For individuals seeking to fulfil innate psychological needs, this potential increase in availability of social resources provides a strong motivator to engage with the platform. Indeed, enhanced social capital derived from SNS use (whether it be perceived or actual) has been shown to provide a host of positive social and psychological outcomes for Facebook users, including increases in perceived social connectedness and belonging, and positive implications for a user's psychological wellbeing (Valenzuela et al., 2009; Valkenburg et al., 2006). For this reason, it is plausible that SNS users suffering from deficits in self-esteem and/or exhibiting signs of social inadequacy (Burke et al., 2010; Ellison et al., 2007; Toma & Hancock, 2013) would feel motivated to use SNS in order to reap the perceived benefits of being connected, allowing them to enhance or even supplement the social and emotional support resources available to them in the offline world. The following section will consider how an individual's motivation to increase the perceived availability of social capital, and the associated positive needs gratifications, can be realised on Facebook via the processes of specific online connective behaviours, online friending, and self-presentation.

#### *1.2.3.2.1.1 Boosting psycho-social needs via Facebook 'friending'*

In the offline world, it has been estimated that the average young person has approximately 5 close others with this figure reducing with age as relationships become more intimate (Dunbar, 2016). Extended networks in the offline world are not uncommon, with previous research by Gest, Welsh, and Domitrovich (2005) showing a tendency for younger people to form extended triads in offline contexts and in particular for younger males to exhibit larger and more transient social networks due to social activity-based bonds. However, when compared to the social spheres that

people connect to online, these triads often pale into insignificance, given that the friends lists of some adolescent and emerging adult users can number in their hundreds and in some cases even thousands (Ofcom, 2012). Furthermore, recent estimates indicate that the average adult Facebook network contains approximately 338 ‘friends’ (Pew Research, 2014).

This apparent desire by some to accumulate large online social spheres has led to the redefining of the term friend. Raynes-Goldie and Fono (2005) suggest that for some the term friend has gained many more connotations than previously held. Whereas in the offline world friendships have traditionally been associated with trust, common interests, and an investment of time (Thelwall, 2008), the term ‘friend’ is now commonly used online to refer to a diverse array of people ranging from closely bonded family members and offline friends to more loosely connected acquaintances, online only connections, and even those whom users do not know (Raynes-Goldie & Fono, 2005).

At its simplest level, the number and diversity of online connections an individual has on a site such as Facebook can provide them with a perceived indication of the level and type of social capital they might have access to. In this way individuals can gain a sense of social connectedness (and in so doing somewhat satisfy their need for relatedness) from perusing both bonding and bridging connections available on their ‘friends’ list (Burke et al., 2010; Ellison et al., 2007; Vitak, 2012). Research has suggested that such perceived online capital has positive associations with an individual’s sense of happiness and wellbeing (Schiffrin, Edelman, Falkenstern, & Stewart, 2010; Valenzuela et al., 2009).

Aside from mere connectivity, Facebook ‘friending’ also serves an important self-enhancing role in terms of providing an individual with opportunities to gain increased reputation and prestige through their perceived popularity and the desirability of the individuals to whom they connect. Linking back to Bourdieu’s (1986) notion of symbolic capital (see p. 34), individuals actively seek out opportunities to gain enhanced social status. On Facebook, such reputation management can be achieved via the accumulation and maintenance of a large visible ‘friends’ list (as an indicator of perceived popularity) or by being seen to connect to others whom are deemed socially popular and/or important to their peers. Theories of friendship formation can be drawn on to explain this apparent desire for social enhancement. For instance, the status-based initiation response model (Hallinan, 1976) states that individuals select their friends using both visual and verbal cues to evaluate a potential friend’s physical attractiveness, attitudes, beliefs, and abilities. Selection of friends is then determined by the individual’s desire to move up in status, befriend those with expected similarities, or gain a sense of superiority. Furthermore, research by Foucault, Zhu, Huang, Atrash, and Contractor (2009) suggests that individuals select potential friendships based on an evaluation of costs and rewards, with individuals forming friendships or avoiding individuals based upon the likelihood of their actions gaining peer approval. As a result, theories such as the ‘Rich Get Richer’ model suggest that individuals will show a preference for forming friendships with popular individuals and avoid association with less popular peers (Valkenburg & Peter, 2007).

The idea that individuals seek to find belonging with some and avoid others complements theories of social identity. Social identity is the part of an individual’s self-concept which derives from their perceived group memberships (Tajfel, 1982). According to social identity theory (Tajfel & Turner, 1979) people are motivated to



achieve a balance between belonging to the people within a group and being distinct from others in different groups. Selectively friending on Facebook provides individuals with the opportunity to realise the need for belonging, whilst at the same time allowing them to carefully manage their distinctiveness by differentiating between users who will enhance their perception of self-identity and those who will not. In so doing, it has been suggested that selectively choosing who to ‘friend’ can provide individuals with opportunities to enhance their self-esteem (Cho & Jun, 2016; Tong, Van Der Heide, Langwell, & Walther, 2008).

Facebook ‘friending’, however, relies on individuals being able to attract and indeed maintain connections online (and offline too). To do this, individuals must engage in some degree of self-presentation on the site, for without a visible profile that is attractive to other users it is unlikely that others will connect (or indeed stay connected) to the individual.

#### *1.2.3.2.1.2 Boosting psycho-social needs via self-presentation*

Theories of self-presentation have suggested that individuals show a tendency to present multiple versions of the self (Bargh, McKenna, & Fitzsimons, 2002). Indeed, Jones and Pittman (1982) suggest that in offline face-to-face settings individuals manipulate these versions of the self by adopting a number of self-presentation tactics including self-promotion, ingratiation, supplication, exemplification, and intimidation. In online social interactions, self-promotion, ingratiation, and supplication have been found to dominate (Dominick, 1999), with all three forms of self-presentation linked to individuals engaging in online impression management to gain perceived social and psychological benefits. Self-promotion (also termed

enhancement) describes an individual's attempts to enhance the perceptions others have of them by extolling their own virtues (e.g., their talents, competencies and intelligence) during social interactions (Jones & Pittman, 1982). This way, users attempt to gain increased reputation, status, and popularity (Christofides et al., 2009; Utz, Tanis, & Vermeulen, 2012; Manago, Graham, Greenfield, & Salimkhan, 2008; Tufekci, 2008; Utz et al., 2012). On Facebook, such self-enhancement can be achieved through the visibility of large and desirable friends lists and via the posting of self-enhancing status updates and images.

Ingratiation, on the other hand, refers to an individual's desire to present a likable self-image in a bid to gain increased social capital and connectivity (Jones & Pittman, 1982). On SNS, such ingratiation can be achieved by individuals presenting information about themselves that show them to be kind, friendly, and able to conform to the social and behavioural norms of their desired social interactions (Ting, 2014). Finally, supplication describes a self-presentation tactic used to gain support and sympathy from others by appearing to be weak and needy (Jones & Pittman, 1982). An altogether more negative form of self-presentation, on Facebook this can be used by individuals seeking emotional and social support by engaging in actions such as disclosing a "cryptic" status updates (e.g., "Can this day get any worse?") or by making highly emotional posts from which to draw sympathy or concern from others.

A core aim of self-presentation tactics is for the individual to selectively manage the impressions they give to others, by presenting traits and characteristics of the self that are conducive to the people they may wish to impress, gain support from, and interact with socially. An early theorist on selective self-presentation was Goffman (1959) who likened social interactions to theatrical stage performances, a so called 'dramaturgical approach', with individuals said to adapt their 'performance' according to the

perceived impression they wished their audience to adopt. So, for instance, an individual may present themselves differently when in the presence of their work colleagues to when in the presence of their close friends or family.

In CMC environments, the selective process of adapting one's self-presentation is considered by Walther's (1996) hyper-personal model. This model suggests that online communication, via the use of internet enabled technologies such as emails, chat-rooms, and instant messengers, allow users to selectively self-present due to the text-based, asynchronous features offered by the applications. As a result, individuals have the time to both reflect on and select the information they share with others. Self-presentation on SNS platforms, such as Facebook, offer many more advanced features for selective self-presentation than early CMC applications (e.g., enhanced visual cues). Research has shown that users can utilise these features to gain improvements to their self-esteem (Gonzales & Hancock, 2011). It is therefore little surprise, that selective self-presentation has been found to be more apparent in Facebook users displaying low self-esteem offline (Zywica & Danowski, 2008). Indeed, a study by Mehdizadeh (2010) of 100 UK undergraduates revealed that individuals with low self-esteem were more likely to selectively present personal images on their Facebook profiles in a bid to present a 'better' idealised version of themselves to the network to which they felt the need to belong.

On Facebook, the most common form of self-presentation is via the self-disclosures and information that individuals present on their profiles (Vitak, 2012; Zhao, Grasmuck, & Martin, 2008). Facebook enables users to share a wealth of information with other users – termed radical transparency by Joinson, Houghton, Vasalou, and Marder (2011) – whether it be the general profile information that users are encouraged to disclose by the account proformas (e.g., real name, age, gender, and

location) or more personal disclosures a user may choose to provide via status updates, photographs, or videos shared. The interactive features of Facebook provide users with a means of gaining visual acceptance and perceptions of social support for their self-disclosures via the 'like', 'comment', and 'share' functionality. As such, when a user self-discloses, whether it be a highly selective image of oneself or a more mundane update to their personal profile (e.g., announcing a new job), individuals can track their level of perceived acceptance and support by keeping track of the number of positive interactions the post gains from their social network. In doing so, individuals have the potential to reap the perceived social and psychological benefits that they expect to gain from their interactions with the Facebook platform.

In common with other forms of CMC, such disclosures are generally asynchronous and therefore editable, allowing individuals to engage in selective self-presentation and impression management. However, a key difference between Facebook and earlier forms of CMC, and indeed face-to-face communication, is that the audience for an individual's self-disclosures can be much wider and to some extent unimaginable (Marwick & boyd, 2011). In the offline world, and some early forms of CMC, individuals are able to adhere to distinct social boundaries set by the context and environment of the interaction, enabling them to project desired and moderated representations of the self as desired (Vitak, 2012). However, on Facebook these different social spheres to which an individual belongs are likely to all reside and overlap in one online ego-centric social network. As a result, these contextually diverse 'friends' are allowed to digitally mingle, with the contextual boundaries of the heterogeneous social spheres in which they reside effectively collapsed (Binder, Howes, & Smart, 2012; Davis & Jurgenson, 2014; Marwick & boyd, 2011). Selective presentation therefore can present a much more complex landscape for the Facebook

user. Self-disclosures rather than being selected on the basis of a particular “audience” or sphere, may need to be selected and indeed curated on the basis of the information being ‘fit for all’, extending any desired self-presentation tactic (e.g., self-promotion, ingratiation, or even supplication) to potentially all users on the individuals online network.

Selective presentation, whether to a specific audience or indeed the whole network, may be seen by some as untruthful. However, research by Marwick (2005) suggests that users engage in truth stretching rather than lying, amplifying the facets of their lives they wish to make public. Furthermore, the manipulation of identity based information on Facebook is not necessarily a common trait amongst all users, with studies indicating that the information shared on many Facebook profiles is generally conducive with an individual’s offline identity (Back et al., 2010; Waggoner, Smith, & Collins, 2009; Weisbuch, Ivcevic, & Ambady, 2009). A reason postulated for this is that the proliferation of offline to online contacts present on Facebook makes it potentially more difficult for users to represent themselves in a fabricated form (Pempek, Yermolayeva, & Calvert, 2009) as many of their Facebook network are already familiar with the ins and outs of their daily lives. As such, some users may aim to provide a more desirable, if somewhat distorted, perspective of themselves rather than a fictionalised account that would potentially ‘turn off’ the connections they wish to gain support and recognition from.

The literature reviewed so far in the thesis, has highlighted how an individual’s offline psycho-social characteristics might motivate them to use Facebook and engage in online behaviours to regulate perceived psycho-social needs deficits. Drawing on a largely positive and self-reported evidence base, the literature has highlighted the many perceived uses and gratifications that engagement with an ego-centric platform

such as Facebook can provide – in essence, the ‘expected’ positive consequences that users might feel Facebook can offer. In doing so, the literature has indicated that by engaging in Facebook use, particularly online ‘friending’ and self-disclosure practices, individuals low in self-esteem or belonging can effectively manipulate the way in which they self-present their identity to their networks to gain desired social interactions, support, and recognition from their peers. For users wishing to perceive themselves (and importantly be perceived by others) to be popular and interesting individuals, such behaviours can offer a means of boosting a user’s psycho-social self-perceptions in a digital world driven by social comparisons. However, as Katz et al. (1974) outlined in their U&G theory, not all consequences of media interaction are as expected.

#### *1.2.3.2.2 ‘Unexpected’ consequences of Facebook use*

Over the past decade, concerns have been raised in the realms of academia (Livingstone, Olafsson, & Staksrud, 2011; Staksrud et al., 2013; Wilcox & Steven, 2013) and anecdotally in the popular press (BBC News, 2015; New York Times, 2014) regarding the potential susceptibility of ego-centric SNS users to incur detriments to their social, psychological, and physical wellbeing when engaging with sites such as Facebook (Davidson & Martellozzo, 2013).

Research by Hasebrink, Livingstone, Haddon, and Olafsson (2009), uses three categories to describe potential risks that an individual might perceive or experience when engaging with internet enabled technologies. These three categories are content risks (e.g., where an individual is on the receiving end of inappropriate online content such as hateful comments), contact risks (e.g., where an individual engages in social

interactions that might lead to negative outcomes such as data misuse or harassment), and conduct risks (e.g., where the individual is the perpetrator of negative and/or inappropriate behaviour). It should be noted that while these categories were borne from research with children, the nature of the risks identified complement the findings of researchers who have considered online risks in older populations (e.g., Binder et al., 2012; boyd & Ellison, 2008; Debatin et al., 2009). Further studies have likewise suggested that use of online platforms might result in individuals encountering a plethora of content, contact and conduct risks (Dredge, Gleeson, & Garcia, 2014; Huang et al., 2014; Lenhart et al., 2011; Madden et al., 2013; Manago, Taylor, & Greenfield, 2012; Staksrud et al., 2013). Such risks and their related outcomes will be explored in more detail in Chapter 2.

It is important to note when considering such online risks that an individual's perception and/or experience of risk does not mean that an individual will necessarily experience harm (Livingstone, 2010). While for some, exposure to a risk online might result in them experiencing psychological, reputational, or even physical harm (Davidson & Martellozzo, 2013), for others such a risk might be judged to be tolerable and as such the potential consequences effectively ignored (Livingstone, 2010). For this reason, Livingstone (2010) suggests that exposure to potential risks online provide a probability that an individual might experience some degree of harm, not a certainty. For the remainder of this thesis, online experiences that could pose a potential risk and/or harm when perceived and/or indeed experienced online by a Facebook user will be termed 'negative online experiences'.

There is much debate in the psychological literature regarding factors that might make an individual more or less susceptible to experiencing negative online experiences. As previously explained at the beginning of the chapter (see p. 24), technology-related

psychological literature can at times demonstrate a rather deterministic tendency, implying that it is the online activities themselves that lead to online negative experiences. While it may be fair to suggest that online technologies present individuals with increased opportunities to experience potentially risky situations, it seems implausible to suggest that merely interacting with the technology can determine whether an individual is more or less likely to experience harm.

An alternative means of approaching such debate has been to consider a much broader range of individual and social characteristics. Research has indicated that an individual's perceptions and potential susceptibility to online negative experiences is likely to be influenced by a range of factors including socio-demographics, such as the age and gender of an individual (e.g., Jones, Mitchell, & Finkelhor, 2013; Raine, Lenhart, & Smith, 2012; Sengupta & Choudhuri, 2011), an individual's psychosocial motivations for using Facebook (e.g., low self-esteem; Forest & Wood, 2012; Lee, Moore, Park, & Park, 2012), online social behaviours (e.g., self-disclosure; Dredge et al., 2014; Huang et al., 2014; Lenhart et al., 2011; Madden et al., 2013; Manago et al., 2012), and the characteristics of the networks (e.g., the number and type of social ties) to which they connect (e.g., Binder et al., 2012; Vitak, 2012). More recently, social anxieties in the form of FOMO have been implicated as a potential factor in SNS engagement. Research by Przybylski and colleagues (2013) has demonstrated the mediating role of FOMO in the relationship between low self-esteem and frequent SNS engagement. At present the influence of FOMO on susceptibility to negative online experiences has not been investigated. However, in light of its apparent associations with an individual's desire to belong and frequent SNS engagement there are good grounds for investigating the impact FOMO might have on factors such as the size and diversity of online networks, rates of self-disclosure, and ultimately an



individual's opportunities to experience a range of online risks and subsequent harm. Therefore, this thesis will explore the role of these factors. Further theoretical consideration of these factors and their potential relationship with negative online experiences will be considered in more detail in Chapter 2.

### *1.3 Research aim*

The present thesis will explore individuals' perceptions and reported encounters of negative online experiences in a bid to determine whether certain individuals and networks are more susceptible to negative online experiences than others. In light of the literature reviewed thus far, the overarching aim of the thesis is therefore:

To consider how offline psychological characteristics (including self-esteem and FOMO), online behaviours (including self-disclosure), and the characteristics of online networks (including the number and type of online connections) are related to the experience and perception of negative online experiences (including risk, e.g., disagreement, connecting to strangers, and harm, e.g., hurtful comments).

Specific research questions relating to this aim will be outlined later in the thesis (see Chapter 2, p.94).

### *1.4 Methodology and design overview*

Whilst research into negative online experiences is on the increase, many of the studies previously conducted have sought to find associations between SNS engagement and online risks and harms through largely self-reported means (e.g., Binder et al., 2012; Manago et al., 2012). Self-report methods are a well-established means of gaining

empirical data in Psychology and provide a useful and well-tested means of gaining data such as socio-demographics and psychological and social characteristics. When considering SNS platforms however, factors such as an individual's network characteristics (e.g., the size and diversity of the network) are not best suited to a self-reported approach. For instance, self-reported estimates of large-scale online network characteristics have been shown to be prone to estimation biases (e.g., network size; Bell, Bellie-McQueen, & Haider, 2007) and in some cases, may be impossible to attain accurately. The present thesis will overcome some of the bias limitations of previous studies by combining self-reported data with digital user and network characteristics derived from the Facebook platform. Therefore, the thesis will provide a better explanation of the factors associated with negative online experiences and in doing so provide a digitally enhanced perspective of the way in which SNS users interact with the social capital that is on offer to individuals online.

Technological advances in data collection methods (Hogan, 2008; Rieder, 2013) now render it possible to combine these well-established research methods with digitally derived network characteristics in order to provide a more accurate means of attaining structural network information through the implementation of Social Network Analysis (SNA). For this reason, the research presented in this thesis has utilised a multi-methods approach to the collection and analysis of data. Combining self-reported and digitally derived data provides a richer and more accurate data base and allows for a greater depth of exploration and interpretation (Bryman, 2015, p.460) of the psychological complexities associated with social networking.

At the heart of the present research lies a self-reported longitudinal survey study with associated data sources, that seeks to address the potential associations between offline user characteristics (e.g., self-esteem and FOMO), SNS behaviours (e.g., use, self-

disclosure, online friending), and the perception and experience of negative online experiences (Chapters 4, 5, and 6). Later chapters combine self-reported measures with digitally derived network data to provide cross-sectional examinations of reported user susceptibility to negative online experiences from the perspective of a user's network structure and connections (Chapters 7 and 8) and self/connection user characteristics (Chapter 9). An age-stratified approach to data collection has been implemented throughout the research in order to gain the perspectives of a broad range of SNS users.

### *1.5 Original contribution*

This thesis provides a greater understanding of the factors that contribute to an individual's online vulnerability to negative online experiences when using online ego-centric SNS. In using a novel multi-methods approach to data collection, the research facilitates in-depth analysis in a manner rarely found in psychological research. Combining self-reported data with digitally derived network characteristics, the thesis provides an interesting and original insight into both the characteristics of SNS users and their online connections (see Table 1.1).

*Table 1.1: An overview of the original contributions*

Original Contribution	Chapter(s)
Combined offline psycho-social vulnerabilities (i.e., lower levels of self-esteem and higher levels of FOMO) are associated with higher self-reported levels of exposure to negative online experiences.	4
Higher levels of FOMO are associated with higher levels of self-reported connective behaviours (i.e., online friending and self-disclosure). These findings extend the research that previously inferred an association with SNS use (see p. 29).	4
Longitudinal evidence supports a cyclic relationship between offline psychological vulnerabilities, SNS use, and self-reported exposure to negative online experiences. Complementing theories that suggest that psychologically vulnerable users may be more likely to enter into a detrimental spiral of online behaviour over time (see p. 30), this thesis is the first to provide direct empirical evidence of the phenomena.	5
The age, gender, and levels of FOMO exhibited by an SNS user can influence the way in which they perceive vulnerability to online risks and harms for themselves and others.	6
The accumulation of large, diverse (socially and structurally) networks was found to be associated with higher reported levels of negative online experiences. This was supported by a combination of self-report and digitally derived data unique to the present thesis.	7

The thesis provided a classification of non-standard, anomalous profile characteristics (e.g., pseudonyms, misclassified profiles, and network outliers) using a methodology not previously evidenced in the literature.	8
A combined dataset indicated that higher numbers of misclassified profiles mediated the association between network diversity and higher reported levels of negative online experiences.	8
A combined multi-level dataset indicated that higher levels of perceived negative online experiences (i.e., disagreement) were found to be associated with sociodemographic factors (e.g., age and gender), psycho-social vulnerabilities (i.e., self-esteem and FOMO) communication patterns, and structural network characteristics (e.g., network popularity).	9

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To date research into negative online experiences has sought to find associations with offline psychological vulnerabilities such as low self-esteem (e.g., Forest & Wood, 2012; Kuss & Griffiths, 2011). Whilst, these provide a useful insight into the way in which psychologically vulnerable individuals might use and gain gratifications when engaging with social media, they do not adequately consider the role of social anxieties such as FOMO. FOMO is a vastly under-researched psychological phenomenon, which has previously been found to mediate the relationship between low self-esteem and SNS use (Przybylski et al., 2013). The present thesis extends the research on FOMO (see Chapters 4, 5, and 9) by considering how FOMO can influence not only psychologically motivated SNS use, but also more importantly rates of connective behaviours (e.g., online friending and self-disclosure) and reported exposure to

negative online experiences. In doing so, the thesis makes a twofold original contribution to knowledge. Firstly, by demonstrating the significant combined psychosocial influence of self-esteem and FOMO on SNS connective behaviours. Secondly, by providing evidence to suggest that FOMO can play an influential role in the perceptions and reported outcomes of SNS users (e.g., negative online experiences). The thesis provides evidence to support these original contributions from both a cross-sectional (Chapters 4 and 6), longitudinal (Chapter 5), and multilevel perspective (Chapter 9). This combined methodological insight allows for a greater understanding of the phenomena than previously identified in the literature.

The combination of self-report and digitally derived network data provide an original perspective on the associations between SNS user demographics, network characteristics, and negative online experiences. The combined dataset overcomes potential estimation biases in the data that can arise when considering online networks (e.g., network size; Bell, Bellie-McQueen, & Haider, 2007). Furthering the research into contextually collapsed online networks (Vitak, 2012) and self-reported online social structures (Binder et al., 2012; McCarty, Killworth, Bernard, Johnsen, & Shelley, 2001), the thesis uses these digitally derived metrics to demonstrate the influence of network size, structural network diversity (see Chapter 7), and non-standard profile characteristics (see Chapter 8) on self-reported rates of negative online experiences. In doing so, the thesis provides a greater insight into the heterogeneous spheres of online social capital that have so far have been defined and measured in common online networks (Binder et al., 2012; McCarty et al., 2001), by providing a real-world indication of how they can be arranged and interconnected, and how such structures can influence the reported experiences of SNS users online.

Furthermore, digitally derived measures of network size (SNS user network) and centrality (network popularity of individual connections) are considered alongside both SNS user demographics and psycho-social motivations (self-esteem and FOMO) to provide a novel insight into the identification of potentially vulnerable SNS users/networks and troublesome online connections (see Chapter 9). Using online friendship data from online networks allows this thesis to consider both the structural characteristics and perceived experiences of the SNS users as they connect and interact with their online ‘friends’.

The new information generated by the thesis, with respect to the influence of FOMO and network connections (from the perspective of both network structure of the SNS user networks and the individual connections residing on those networks), delivers valuable insights for academics, practitioners, policy makers, and other stakeholders including educationalists, parents, and worldwide SNS users. A further detailed discussion of the contribution made by the thesis is presented in Chapter 10.

### *1.6 Structure of the thesis*

The remaining chapters of the thesis are structured as follows:

**Chapter 2** discusses the concept of negative online experiences in the realms of SNS use and provides a comprehensive review of the literature to date. The chapter provides a clear understanding of the research background and theory relating to specific online risks and harms and the associated psychological vulnerabilities that have previously been linked to frequent and continued use of online SNS. Chapter 2 also provides a conceptual framework for the research, outlining the key research questions posed by the thesis.

*Chapter 3* outlines the methods used during this research and provides a detailed overview of the sample, measures, and procedures involved. An overview of the operationalisation of the conceptual framework and research hypotheses is provided. Data collection methods, such as the use of secure online surveys and network data capture, are described from both a procedural and ethical perspective.

*Chapters 4 and 5* present the results of a self-reported online survey. In doing so they provide an empirical exploration of the potential impact of offline psychological characteristics (e.g., self-esteem and FOMO) on SNS behaviour and an individual's reported negative online experiences. Findings are presented from cross-sectional (Chapter 4; N = 489) and longitudinal datasets (Chapter 5; N = 175), using a structural equation modelling approach to analysis. Individual differences in SNS user age and gender are also explored.

*Chapter 6* further explores negative online experiences by considering the degree to which individuals engaging with SNS perceive themselves and others to be vulnerable. An ego-user's perception of risk has the capacity to influence the effectiveness of awareness raising and safety interventions that might be borne from research into online vulnerability. The findings discussed in this chapter demonstrate the key differences in age related perceptions. They also demonstrate the role of a user's psycho-social characteristics in these perceptions.

*Chapter 7* builds on the self-reported research by using a combined dataset of self-report and digitally derived data (N = 177) to provide an in-depth analysis of a specific FOMO-inspired online connective behaviour: online friending. The chapter explores the impact that accumulating large, heterogeneous, and potentially unmanageable networks can have on an individual's reported exposure of negative online



experiences. The research presented reports on a mediation analysis that combines digitally derived structural measures of network size and diversity with self-reported measures.

**Chapter 8** extends the mediation analysis discussed in Chapter 7 ( $N = 177$ ) to consider the role of specific network characteristics play in influencing an individual's exposure of negative online experiences. In-depth analysis of digital friendship lists is used to highlight the occurrence of misclassified profiles in user networks. The findings demonstrate how connecting to such non-standard profiles has the potential to further exacerbate a SNS user's experience of negative online events.

**Chapter 9** presents the analysis of 5113 network contacts from 52 UK based Facebook SNS-users. Combining self-reported information and relational ratings pertinent to both SNS users and their contacts with digitally derived network data, the chapter seeks to use multilevel modelling to identify potential characteristics of the individuals that play significant roles in vulnerable online networks.

**Chapter 10** concludes the thesis with a general discussion of the main findings presented in the thesis and the implications that they carry, a review of the methods used, and the research limitations. The original contribution to knowledge made by the current research will also be further discussed, outlining how both the findings and methodological approach increase our understanding of the offline and online factors associated with negative online experiences for users engaging with SNS. Opportunities for future research are also discussed.

## **Chapter 2: Negative Online Experiences**

### *2.1 Chapter introduction*

Staksrud et al. (2013) suggest that it is not the act of being a SNS user that makes an individual vulnerable to negative online experiences but rather how that individual engages with and interacts with the network itself. Exposure to negative online experiences on SNS has been linked to several behavioural factors including increased use (i.e., time online), information disclosure (i.e., profile information and posts), and friending habits (i.e., network size; Madden et al., 2013, Manago et al., 2012; Staksrud et al., 2013). Building on the overview of the more unintended and potentially risky consequences of SNS use discussed in Chapter 1 (see Section 1.2.3.2.2, p.45), Chapter 2 provides a detailed review of the current literature concerning how these behavioural factors relate to an individual's potential exposure to negative online experiences. Starting with a general overview of negative online experiences, the chapter discusses the interplay between online opportunities and offline vulnerabilities in the potential susceptibility of ego-centric SNS users. In doing so, the chapter reflects on the types of user that may be more likely to be involved in vulnerable networks and the methods used to capture this information. The chapter culminates in the presentation of a conceptual framework and the research questions relevant to the present research.

### *2.2 Negative online experiences*

Over the past decade, the online safety of ego-centric SNS users has been a frequent source of debate in academia (Livingstone, Olafsson, & Staksrud, 2011; Staksrud et al., 2013; Wilcox & Steven, 2013) and also the popular press (BBC News, 2015; New York Times, 2014). Increases in SNS engagement, facilitated by mobile applications,

round the clock access to internet connectivity (Ofcom, 2015<sub>ab</sub>), and the potential of users to experience FOMO (Przybylski et al., 2013), has led to increases in the size and diversity of online networks (Madden et al., 2013; Manago et al., 2012) and also rates of self-disclosure (Christofides et al., 2009). This has prompted concerns about the potential susceptibility of individuals to negative online experiences (Hasebrink et al., 2009) and their exposure to a range of online risks (Debatin et al., 2009), which may or may not result in subsequent harm to their psychological, social/reputational, and/or physical wellbeing (Davidson & Martellozzo, 2013; Livingstone, 2013).

To date a range of psychological literature has suggested that the online activities and experiences that people encounter whilst using SNS might lead to potential negative outcomes (i.e., harms such as experiencing lower levels of well-being). Psychological wellbeing describes an individual's ability to manage their daily lives in a productive and meaningful manner and is said to encapsulate subjective wellbeing (the experience of emotions and life satisfaction), psychological functioning, sense of identity, and positive interpersonal relationships leading to feelings of belonging (Ryff, 1989; Tennant et al., 2007). Negative associations between SNS use and psychological wellbeing have been demonstrated in several previous studies (Hayes, van Stolk-Cook, & Muench, 2015; Kalpidou, Costin, & Morris, 2011; Kross et al., 2013). For example, a survey study by Satıcı and Uysal (2015) looking at the relationship between Facebook use and the psychological wellbeing of 311 undergraduate students found negative associations between Facebook use and decreased levels of participant life satisfaction, subjective happiness, and vitality.

Closely associated with psychological wellbeing is the state of social and reputational wellbeing. Linked to an individual's ability to gain symbolic capital (Bourdieu, 1984; see Section 1.2.3.2.1, p.33), Emler (1990, p.171) defines reputation as a "*set of*

*judgments a community makes about the personal qualities of one of its members.*” In the offline world, the identity that an individual portrays to others is evaluated against a set of norms pertinent to the community in which they reside (Emler, 1990). Individuals seen to be breaking those norms leave themselves open to a bad reputation, gossip, and potential future ostracism from the community, whereas identities judged to conform can secure a good reputation and attract valuable social capital and support (Wu, Balliet, & Van Lange, 2016).

On ego-centric SNS, maintaining one’s social reputation presents a complex task. Reputational information on sites such as Facebook can be derived not only in the self-disclosed data posted by the user, but also from posts made by their connections in which they have been directly named (i.e., tagged). The size and diversity of online networks means that such information is likely to be judged against numerous different sets of social norms (Vitak, Blasiola, Patil, & Litt, 2015). For instance, the social norms of a group of friends are likely to differ from the social norms of an individual’s parents or work colleagues. Expectancy violations theory (EVT; Burgoon & Jones, 1976; Burgoon, 1993; McGlaughlin & Vitak, 2011) postulates that individuals will react differently to unexpected norm violations by others depending on their relationship with those involved. When an individual is known to the SNS user in both online and offline contexts, their online actions are more likely to be judged according to norms of behaviour relating to offline social boundaries. Therefore, online behaviours that are seen to fall short of the norm expectations attributed to the online connection in the offline world, may not be deemed appropriate for all SNS users to whom they are connected. Such a discrepancy can leave individuals open to reputational damage (i.e., harm) if their online disclosures, or indeed the posts made by their ‘friends’, are not adequately moderated (Binder et al., 2012). To this end, a

number of studies (Litt et al., 2014; Madden & Smith, 2010; Yang, 2016) have demonstrated the potentially negative effects that SNS can have on an individual's reputation.

The use of ego-centric online SNS has also been associated with deleterious impacts on a user's physical wellbeing. Excessive use of the sites, the individuals with whom users connect and the information they disclose have been shown to be related to a host of potential physical risks including deficits in sleep (Vernon, Barber, & Modecki, 2015; Xanidis & Brignell, 2016), addictive symptoms (Kuss, Griffiths, & Binder, 2013), and offline violence (Luxton, June, & Fairall, 2012; Yardley & Wilson, 2015).

While, the evidence described would suggest reasonable grounds to believe that SNS use has the potential to cause detriments to a user's wellbeing, the interplay between the opportunities, risks, harms, and vulnerabilities associated with SNS is not necessarily straightforward (Livingstone, 2013). The following sections of the thesis demonstrate how the opportunities that SNS provide (e.g., use), can be linked to a range of potential online risks and harms, and how these might differ due to the offline vulnerabilities of the individuals involved and the contacts with whom they connect.

### *2.3 From opportunity to harm*

As discussed in Chapter 1 (see Section 1.2.3, p. 23), SNS afford their users many opportunities (e.g., access to social capital). The greater the perceived benefits and opportunities an individual expects from an online platform, the more time they are likely to spend online (Livingstone & Helsper, 2010). However, with increased online usage comes a higher level of probability that individuals will be exposed to an

altogether more negative side of online life as a result of being exposed to online risks (Hasebrink, Görzig, Haddon, Kalmus, & Livingstone, 2011).

### *2.3.1 Online risks*

Online risks can be both difficult to define and to measure (Hasebrink et al., 2009). Compounded by the interchangeable use of the terms ‘online risk’ and ‘harm’, Livingstone (2013) argues that it is important to acknowledge that there is a distinction between the two. Livingstone (2013, p.24) describes online risk as “*a calculation based on probability and the likely consequences of harm,*” (i.e., the possibility that something negative might happen) whereas, harm is “*a distinct outcome, whether measured objectively or subjectively.*”

#### *2.3.1.1 Categorising online risks*

Research has identified a host of potential online risks for both adolescent and adult users (Debatin et al., 2009; Hasebrink et al., 2009; Trepte, Dienlin, & Reinecke, 2014; Ybarra & Mitchell, 2007), including exploitation of personal information, harassing behaviours, communication with unknown others and exposure to inappropriate content (i.e., sexual, violent). Hasebrink et al. (2009) categorise such risks as content risks, contact risks, and conduct risks. Content risks are used to classify online risks in which the user is the recipient of information (e.g., commercial advertising, inappropriate content, and biased content). Contact risks refer to risks in which the online user is a participant in communications with peers or other users of the technology (e.g., arranging to meet offline, being harassed), while conduct risks describe risks in which a user is an instrumental actor in the risk (e.g., creating inappropriate or offensive material, harassing another user). The number and type of

online risks that a SNS user might perceive or actually experience might vary according to the age and experience (e.g., life experience and/or digital literacy) of the user (Christofides, Muise, & Desmarais, 2012; Livingstone & Helsper, 2010). The present thesis provides an overview of content, contact, and conduct risks deemed pertinent to a wide range of potential SNS users (Debatin et al., 2009; Hasebrink et al., 2009; Trepte et al., 2014; Ybarra & Mitchell, 2007).

#### *2.3.1.1.1 Exploitation of personal information (Contact Risk)*

A vast amount of data is shared by SNS users on a daily basis, with approximately 4.75 billion pieces of content shared each day in 2015 on Facebook alone, including uploads of around 250 million photographs (Hodis, Sriramachandramurthy, & Sashittal, 2015). Studies have shown that SNS users regularly disclose a wealth of personal data including their real name, gender, date of birth, contact information, location, thoughts and feelings, and personal photographs to an average of 300 online contacts (Christofides et al., 2009; Gross & Acquisti, 2005). Furthermore, the recent addition of live streaming capabilities such as Facebook Live (Facebook, 2016a) provides users with the opportunity to give an account of their activities and whereabouts in real time. However, disclosing information on wide and varied networks has the potential to leave SNS users open to an array of risks and harms including instances of data misuse and exploitation, prompting concerns regarding SNS users' data privacy (Debatin et al., 2009; Fogel & Nehmad, 2009; LaRose & Rifon, 2006; Lee, Im, & Taylor, 2008) and the potential for identity theft (Wall, 2013). While data misuse and identity theft can occur elsewhere online (National Office of Statistics, 2016), there have been a number of well-documented and at times shocking anecdotal cases in the popular press of how the information contained on a SNS

profile, however limited, can be used to procure duplicate SNS profiles for fraudulent and/or malicious purposes (Huffington Post, 2016; Wall, 2013) such as harassment (NY Daily News, 2016; Sunday Post, 2016), deceit (BBC News, 2015; Telegraph, 2015b), and extortion (Woods, 2014).

The risk of data exploitation is heightened on sites such as Facebook due to the unprecedented amount of information that is self-disclosed. Users of SNS have found themselves in the midst of an online paradox. On the one hand, SNS platforms openly encourage users to share and self-present; on the other hand, campaigns to warn users of the apparent risks of self-disclosing personal information are frequently promoted by government agencies, online safety initiatives, and even the platforms themselves (Facebook, 2016b; Get Safe Online, 2016; Safer Internet, 2016; ThinkUKnow, 2016). So, why is disclosing information potentially problematic?

Disclosing and sharing information online is not a new concept. Earlier forms of computer-mediated communication (e.g., online forums, instant messaging) promoted information sharing with online contacts, although in many cases the contacts were anonymous (either fully or at least visually) to the user. Such anonymous communications have been linked to the disinhibition effect (Suler, 2004). The disinhibition effect suggests that internet users display a tendency to reveal a lot more about themselves online than they would offline due to the relative anonymity of users on the networks. Indeed, early forms of CMC allowed individuals to connect anonymously and communicate via predominately text-based means. As a result, the disinhibition was said to promote more frequent and intense self-disclosures between online contacts in early forms of CMC, with users often revealing facets of their lives that they would not normally disclose to others in the offline world (Suler, 2004).



As CMC technologies have evolved, online platforms have moved away from anonymous communications, providing users with multimedia-rich alternatives. The frequency and intensity of self-disclosures have however not diminished, with sharing of personal content now being the norm. Modern SNS platforms utilise a means of communication that is ‘nonymous’, as profiles are linked to an individual’s real identity (Zhao et al., 2008). While both forms of CMC (new and old) afford users the opportunity to selectively self-present the self (Walther, 1996; see Chapter 1, p.42), on ‘nonymous’ platforms, people have a much greater tendency to ‘show’ facets of their identity by sharing status updates, pictures, and videos with their online connections. SNS such as Facebook actively encourages such self-disclosure and sharing to be conducted in an increasingly open and transparent manner – a phenomenon termed radical transparency by Joinson (2008, 2011) – through their implementation of a real-name policy (Hogan, 2008). Transparent sharing of information is said to positively promote a more open society and facilitate meaningful interpersonal relationships (Joinson et al., 2011). However, with SNS sites awash with identifiable personal, social, and visual cues they also provide a persistent, searchable, visible, and replicable account of a user’s daily life (boyd, 2007).

Potential online risks associated with SNS are intrinsically linked to these key characteristics of online communication: persistence, search-ability, visibility, and replicability, as defined by boyd (2007). SNS data are persistent as they are stored indefinitely by the service provider in a format that can be readily searched for by the user or indeed a third party. In this way, status updates, pictures, videos, and interactions between online friends form a permanent, searchable, and highly visible digital record of the online user. In addition, the replicability of SNS data affords the opportunity for information posted on SNS to be easily manipulated and/or taken out

of context (Speisa, 2014; Wilson, 2013) as with each share it becomes increasingly more difficult to differentiate between the original and the copy (Livingstone et al., 2011).

The characteristics of online data have sparked a number of privacy debates in a society increasingly concerned by the use of ‘Big Data’ (Ausloos, 2012), the ‘right to be forgotten’ being one of the most prominent (Mayer-Schonberger, 2009). The ‘right to be forgotten’ is defined as “*the right of individuals to have their data no longer processed and deleted when they are no longer needed for legitimate purposes*” (European Commission, 2010, p.8). The internet age has seen a shift in an individual’s personal control over their data, with digital technologies promoting a culture of ‘remembering’ rather than ‘forgetting’ (Mayer-Schonberger, 2009). The European Union (EU) implemented an updated ‘right to be forgotten’ policy in 2014 (Frantziou, 2014), rendering it possible for individuals to request the removal of personal online data from search engines such as Google. However, not all countries worldwide have subscribed to this or a similar policy. As such, individuals sharing information on SNS should be aware that if their information is stored and/or replicated on a site not governed by EU laws and regulations, such a right is unlikely to be upheld. Therefore, while information and interactions disclosed on SNS can present a number of useful opportunities, the persistence, search-ability, visibility, and replicability of the data leaves the SNS user open to widespread scrutiny from others (known and unknown) and potential exploitation, which may, depending on the nature and context of the content posted and the size of the network, become a source of potential future embarrassment or damage (Lenhart et al. 2011; Smith & Kidder, 2010). The present thesis will explore the extent to which individuals might be exposing themselves to such potential risks by considering the relationship between psycho-socially motivated

self-disclosure of personal information and reported exposure to negative online experiences (see Chapters 4, 5, and 9).

#### *2.3.1.1.2 Exposure to inappropriate content (Content Risk)*

Inappropriate content has been defined as content that users may find disturbing or explicit (Victoria State Government, 2013). While much of the content posted on SNS is relatively harmless, and in some cases quite mundane, engagement with SNS and the accumulation of large, diverse networks carries the risk of users being exposed to inappropriate content (Livingstone et al., 2013). Individuals can be exposed to inappropriate content on ego-centric networks, such as Facebook, accidentally through their newsfeed, by actively searching for it, or by receiving such content directly from an online contact (Hasebrink et al., 2011).

Exposure to inappropriate content is a concern for many internet users. A survey study of young European internet users (N = 10,000, 9 – 16 years) by Livingstone et al. (2013) identified that content risks were one of the most pertinent worries with regard to internet use, with 58% identifying exposure to violent, pornographic, or other adult-themed inappropriate content, as a major risk of engaging with online sites. While these apparent content risks were identified for children and young adolescents, such concerns have been mirrored for adults in findings by Ofcom (2016) in which 60% of UK adult internet users (N = 1,841, 16+ years) indicated that they thought they should be protected from inappropriate content whilst online.

In terms of actual exposure, a number of studies have addressed factors that have the potential to influence the likelihood of an individual encountering inappropriate content, including age, gender, and socio-cultural background. It has been estimated that 30 – 50% of adolescents have been exposed to violent, sexual, hateful, or other

adult content while engaging with the internet (Livingstone et al., 2011; NSPCC, 2016). Similarly, in a study by Raine et al. (2012) indicated that approximately 30% of adults have reported seeing offensive content and language used (Rainie, Lenhart, & Smith, 2012), with higher rates of reporting offensive material found in younger adults, females, and parents. Furthermore, individuals from ethnic minorities were more likely to report exposure to inappropriate content, with 42% of black SNS users and 33% of Hispanic users reporting more frequent exposure to racially offensive language (e.g., hate speech) and/or images, compared with only 22% of white SNS users.

The context in which data is posted can present a challenging issue in terms of data appropriateness. On a global level, the recent cases of Facebook Live being used to stream real-time footage of police shooting incidents (CNN, 2016) in the USA presents an interesting paradox in terms of data appropriateness. Referencing Facebook's own data policies, it could be argued that such content would be in breach of acceptability due to the videos' extreme and violent nature (Facebook, 2016). One could argue that the persistence and replicability of such information could also be used as a means of inciting future acts of violence. For instance, 'live' streamed video on Facebook is posted as a regular video once live streaming has ended rendering it both persistent and replicable via user sharing. However, Facebook has passed such content as being appropriate on the grounds of "context" (Fortune, 2016). On a local level, the nature of ego-centric personal networks means that users will play host to a multitude of contextually collapsed and overlapping social spheres on their networks (Vitak, 2012), including known offline contacts, online only contacts and even users linked to commercial organisations. For this reason, content shared by the users on a personal network might not always be deemed appropriate for all members of the

network to which it has been broadcast. The present thesis will consider inappropriate content from the perspective of SNS users reporting the extent to which they have been exposed to content of an inappropriate nature (e.g., sexual or violent content) when engaging with the SNS platform online. Such reports are combined with other negative experiences (e.g., social embarrassment and data misuse) to provide an overall measure of the rate at which negative online experiences are perceived and/or experienced online. This measure is used throughout Chapters 4 to 8 of the thesis.

#### *2.3.1.1.3 Creation of socially embarrassing or inappropriate content (Conduct Risk)*

As SNS users spend an increasing amount of time online the likelihood of them sharing open and potentially inappropriate information amongst their networks also increases (McKinney, Kelly, & Duran, 2012; Roulin, 2014). Such incidents are often termed, social gaffes or faux pas, and have the potential to cause the SNS user and/or their contacts social embarrassment and/or reputational damage. The creation of inappropriate content can be unintentional as in, for instance, the anecdotal case of a grandmother who inadvertently posted a private message to the main Glastonbury Facebook page reminding her granddaughter to take her wellington boots (Mail Online, 2016). Social gaffes can also be a by-product of a user's intentional use of SNS. For instance, a study by Peluchette and Karl (2009) of 346 US college students found that the posting of reputationally spurious content was linked to an individual's self-image. Individuals who wished to portray themselves as wild and controversial were more likely to post inappropriate or contentious content as a means of ensuring their online presence matched their intended portrayal of self-image.

On SNS, users are afforded the relative freedom to share information of their choosing. SNS sites such as Facebook therefore contain a myriad of self-disclosures and

interactions ranging from the mundane and harmless (e.g., pictures of someone's breakfast) to the risqué (e.g., details of drunken, sexual, or drug fuelled exploits). Risqué content is not uncommon on SNS. A study by Peluchette and Karl (2007), looking at the profiles of 200 college based Facebook users, found that approximately half of the profiles and social interactions sampled contained references to alcohol (53%) and profanity (50%), 40% had posted negative comments about others, and 25% had posted sexually provocative pictures. While sharing risqué content is not in itself necessarily wrong, the use of a semi-public online platform increases the chances of the content being viewed by individuals whom might find it contextually inappropriate.

In the offline world, individuals share carefully managed and moderated projections of their identity (Vitak, 2012). For instance, the way in which people act and/or the things that they say in front of their friends is likely to be very different to how they wish to be perceived by their family or work colleagues. However, on SNS, contextually diverse social spheres reside and overlap in a common digital space in which social boundaries are contextually collapsed (Vitak, 2012), therefore the likelihood of an individual or indeed one of their connections posting something that is not suitable for the SNS user's entire network is likely to increase as the diversity of the network increases (Binder et al., 2012; Davis & Jurgenson, 2014; Marwick & boyd, 2011). In this way, social gaffes have the facility to promote tension on a network, as the social norms and expectations of contextually different social spheres collide (Binder et al., 2012).

Potential reasons for making socially embarrassing gaffes or faux pas on SNS have been addressed in previous research. A mixed methods study by Wang et al. (2011)

involving 569 adult Facebook users identified a number of reasons why individuals would post socially risqué content online. These included:

- 1) Wanting to be perceived by other SNS users in a favourable way (e.g., posting sexually provocative personal pictures in a bid to appear attractive to other users on the network);
- 2) Misjudgement of the social and cultural norms associated with their online connections (e.g., a male SNS user posting a risqué joke about female driving ability that is offensive to female ‘friends’ within the user’s network);
- 3) Not being able to effectively imagine the audience to whom the content is being posted (e.g., posting an ‘in-joke’ between a small group of friends across the whole network);
- 4) Posting while in a heightened emotional state (e.g., posting an angry tirade about a situation or person that the user is not happy with);
- 5) Posting while under the influence of alcohol or drugs (e.g., sharing pictures/videos of drunken/drug fuelled exploits that show the individual and/or their friends in a bad light); and
- 6) Not truly understanding the way in which the SNS platforms work (e.g., an individual may lack digital literacy and inadvertently share information across their personal or wider network).

The likelihood of making socially embarrassing faux pas has also been linked to an individual’s personality. A survey study of 636 US and German university students by Karl, Peluchette, and Schlaegel (2010) looking at the posting of faux pas on Facebook showed that individuals scoring higher in compulsive internet use were more likely to post socially problematic information to their profiles. Such a finding highlights how excessive time online and a desire to maintain constant connection might drive an

individual to share information that is not socially fit for purpose. The present thesis will consider both the context of the network (i.e., who they are connected to) and the extent to which individuals self-disclose both emotionally driven content (e.g., posting when angry) and general profile information (e.g., pictures of friends/family). In doing so, the relationship between self-disclosure and exposure to negative online experiences will be explored (see Chapters 4, 5, and 9).

#### *2.3.1.1.4 Connecting to others (Contact Risk)*

Increasing the size of one's social network has been shown to increase an individual's social support and sense of belonging (Ellison et al., 2007). On SNS, individuals have the capacity to build on their social support by connecting to known and unknown others. Connecting to others on SNS has been shown to have beneficial effects on an individual's level of social support and wellbeing (Bae, Jang, & Kim, 2013). However, a number of concerns exist about the potentially detrimental effects that interacting with social ties, both known and unknown, might have on a SNS user's psycho-social and physical wellbeing (Livingstone & Helsper, 2007; Sengupta & Chaudhuri, 2011; Staksrud et al., 2013). The present thesis explores the relationship between a SNS user's online connections (i.e., number and characteristics) and reported exposure to negative online experiences. Contact risks are considered from the perspective of both self-reported and digitally derived data.

##### *2.3.1.1.4.1 Unknown or loosely connected others*

Concerns about connecting to unknown others are not new. In fact, stranger danger has been a concern since the dawn of computer-mediated communication (Berson,



2003; Horton, 2001). Early incarnations of CMC provided largely text-based and anonymous means of communicating with individuals via internet-based platforms such as chat rooms, forums, and instant messaging services. CMC platforms were predominately used to communicate with strangers (Wolak, Mitchell, & Finkelhor, 2002), as limited internet and technological availability was not conducive with widespread adoption of the platforms. Time spent fostering such anonymous friendships online was frequently linked to a decline in offline social networks and interactions with family members and an increase in loneliness (Kraut et al., 1998). Although it should be noted that Kraut and colleagues reported these effects over the course of 1-2 years from going online in the 1998 article and then reported negative effects having disappeared over 2-3 years in their 2002 article (Kraut et al., 2002).

In contrast to CMC platforms, individuals do not generally join friend-based ego-centric SNS with the intention of connecting to strangers (Ahn, 2011; Ellison, Steinfield, & Lampe, 2011). Research into SNS friending by Bryant, Sanders-Jackson, and Smallwood (2006) who reviewed the social networking habits of 40 adolescents has suggested that young people generally use SNS to interact with known associates such as offline friends and family members. Such findings have been mirrored in a study of 92 adult SNS users by Pempek et al. (2009) and in a large-scale national UK survey by Ofcom (2012) in which it was estimated that 80% of users predominately used these sites to communicate with others who were known to them in the offline world and 53% to actively seek out old friends. Interestingly though, it is estimated that as many as 20 to 25% of online 'friends' are unknown to adolescent and adult users in an offline context (Ofcom, 2012). Such findings suggest that, as was common in the days of early online communication, SNS are also frequently being used to

facilitate online connectivity with unknown others and/or social ties who may only have the loosest of connections to the user.

As access to SNS profiles can be restricted, with users having the option to make their profile private or open to the public, it has been implied that SNS users who communicate with strangers, or loosely connected social ties choose to do so willingly (Subrahmanyam & Greenfield, 2008). This is supported by large national surveys in the UK and USA that have suggested that approximately 48% of adults (Ofcom, 2012) and 60% of adolescent SNS users (Lenhart & Madden, 2007) have profiles that are openly accessible and searchable to unknown others due to their desire to make new friends and converse with people they do not know.

Accessible profiles are not the only means of attracting the attention of strangers on an ego-centric network. Facebook friend lists provide users with a means of connecting to individuals they may not personally know but who are associated via a 'friend'. Concerns have been raised that connecting to strangers and/or very loosely connected social ties online might also invoke risks for other friends on social media (Heirman et al., 2016). For instance, when a user connects to an unknown other they provide the stranger with access to their friends list and the opportunity to connect to others on the network. Mutual friendship is often used on social media as a means of gaining validation for accepting new connections (Patil, 2012). It has been suggested that some adolescents are prone to accepting friend requests from mutual friends and acquaintances of people that they are actively connected to, even if they do not know them personally (Nagle & Singh, 2009). In this way, if one user accepts an unknown or loosely connected person as a Facebook friend, this may then lower the threshold for other friends to accept that previously unknown person, potentially leaving those

friends open to vulnerability of risk and harm by connecting to a largely unknown and potentially unpredictable social tie on the network.

Motivations for connecting to unknown and/or loosely connected others via SNS have been explored. A review by Valkenburg and Peter (2011) highlighted possible associations between an apparent willingness of SNS users to forge exclusively online friendships and factors such as boredom relief and compensation for a lack of social skills. Furthermore, an experimental study of 513 Facebook users by Patil (2012) looking at individuals' openness to friending strangers demonstrated that people were more likely to accept friend requests from unknown others if they had an attractive profile photo on display. Whatever the motivation, accepting friend requests from strangers and/or very loosely connected social ties has been shown to increase the likelihood of users being exposed to a range of negative online experiences including data exploitation (Vishwanath, 2015), blackmail and fraud (Kadkol, 2015), and online grooming (Mitchell, Finkelhor, Jones, & Wolak, 2010). Furthermore, a study by Lenhart et al. (2011) showed that acceptance of unknown friendship requests increased the users' likelihood of online harassment and victimization. The present thesis explores SNS users reported negative online experiences by considering the size, structure, and characteristics of individuals' networks. In doing so it combines self-report and digitally derived data to provide an insight into the potential implications of connecting to large, contextually diverse networks of contacts online (see Chapters 7, 8, and 9).

#### *2.3.1.1.4.2 Non-standard 'friends'*

Safely navigating an online network may also be compromised by the presence of 'friends' who are not characteristic of traditional online connections. Most SNS, and indeed most internet services, do not recognise individuals, but user accounts. The assumption, however, that all user accounts represent true, individual people is not warranted. Accounts may be misclassified, and also include or omit information that is important for the SNS user to reliably identify other contacts. For instance, an account may represent a company or non-person entity, not specify personal details (e.g., gender), or be identifiable only by a pseudonym. Non-standard online contacts can therefore make it even more difficult for a user to form an impression of their actual audience.

The presence of non-standard network connections has the potential to further complicate the SNS user's ability to effectively manage and moderate their online communications. While users view their close social spheres as points of reference for generating their target audience on social media (Marwick & boyd, 2011), sporadic cases of non-standard profiles are likely to be less salient. Lack of salience in a contextually collapsed network could render the non-standard profile unimaginable to the SNS user when posting content, effectively allowing unmoderated content to be visible and accessible to the non-standard profile. Additionally, the SNS user's vulnerability to malicious behaviours such as exposure to inappropriate content, data misuse, and harassing behaviours are likely to increase due to the privacy implications of sharing data with profiles that may or may not be representative of a known and trusted individual. The present thesis uses digitally derived data to explore the rate at which non-standard profiles occur in SNS user networks, and their associations with negative online experiences (see Chapter 8).

#### *2.3.1.1.5 Harassing behaviours (Contact Risk)*

Online harassment can be viewed as both a risk (Hasebrink et al., 2009) and a detrimental result of engaging with online life (Jones et al., 2013). SNS provide an online conduit for spurious individuals (known and unknown) to target and harass other users (Kwan & Skoric, 2013). Online harassment can be defined as technology-mediated threats or other offensive behaviours that are targeted directly at an individual or posted online for others to see by known or unknown others (Jones et al., 2013; Slonje & Smith, 2008). The majority of incidents of online harassment involve one-time events that may not be distressing for the target (Wolak, Mitchell, & Finkelhor, 2007). In such cases, it has been estimated that approximately 45% of adult SNS users and 35% of adolescent SNS users frequently ignore offensive behaviour online (Raine et al., 2012). However, online harassment can also occur as part of a more sustained pattern of abuse, rendering it a potential harm that may result in the targeted individuals being physically threatened, emotionally distressed, or having their reputation compromised (Jones et al., 2013).

Online harassment is a dominant feature in SNS-related media coverage worldwide, with anecdotal incidents of online victimisation and cyber-bullying rife (Manchester Evening News, 2016; Telegraph, 2015a, 2016). Longitudinal research into youth prevalence rates of online harassment in the USA have indicated a steep increase in potentially damaging online incidents, with harassment levels almost doubling between 2000 and 2010 from 6% to 11% (Jones, Mitchell, & Finkelhor, 2012). Furthermore, a large survey study by Raine et al. (2012) indicated that 13% of adult SNS users have experienced someone acting in a mean or cruel way towards others whilst online. Similar patterns of prevalence have been evidenced in the UK and Europe (Livingstone & Smith, 2014).

Incidents of online harassment can incorporate the spreading of damaging gossip and rumours, hurtful or threatening comments, and/or receiving unwanted attention from strangers (Sengupta & Choudhuri, 2011; Slonje & Smith, 2008). A range of online behaviours have been linked to increased risk of encountering online harassment. These include the uploading of personal pictures; disclosing information about an individual's location, the school that they attend or their contact details (e.g., phone number, email address); accepting friend requests from unknown or very loosely connected social ties; and visiting online groups/forums that are open to the wider SNS community (Lenhart et al., 2011; Sengupta & Choudhuri, 2011). Furthermore, the age and gender of SNS users has also been found to impact on users' experience of harassment on SNS, with younger females being particularly vulnerable (Jones et al., 2013; Sengupta & Choudhuri, 2011).

Associations have been made between engagement with online platforms and online abuse and harassment (Finkelhor, Mitchell, & Wolak, 2000; Ybarra & Mitchell, 2008). However, research suggests that SNS use alone may not be a significant determinant of the risk of online harassment and/or harm (Staksrud et al., 2013). Instead it has been suggested that individual differences, self-disclosure behaviours, the social ties to whom people connect (known and unknown), and the manner in which individuals interact with their online connections are more pertinent predictors of falling victim to being harmed by the harassing behaviours of others (e.g., Sengupta & Choudhuri, 2011; Staksrud et al., 2013). The present thesis considers SNS users' exposure to potential contact risks by exploring self-reported exposure (perceived and actual) to negative online experiences, pertinent to both their general network engagement (Chapters 4 to 8), and specific individuals in their network (see Chapter 9).

### *2.3.2 Do online risks necessitate harm?*

Not all online risk will lead to harm (Livingstone, 2013; Staksrud et al., 2013). Research by Livingstone et al. (2011) suggests that while there is a probability that being exposed to online risks might result in harm (e.g., deficits in psychological, reputational or physical wellbeing), this result cannot be taken as an automatic outcome. Whether an individual experiences harm is likely to be influenced by several factors including demographics (e.g., age and gender), an individual's psycho-social motivations, socio-cultural background, and their resilience to coping with such situations (Hasebrink et al., 2009; Jones et al., 2013; Livingstone, 2013).

In the offline world, the relationship between an individual's potential exposure to risk and their subsequent harm is quite straightforward (Livingstone, 2013). For instance, an individual who smokes cigarettes (the risk) is likely over time to develop a lung complaint (the harm). The relationship between the risk and harm is measurable, as for the most part smoking related illnesses are recorded by medical professionals. As such, it is relatively easy to determine the extent of the harm caused by smoking, the types of people who engage in the behaviour, and ultimately the steps that can be taken to educate people in an attempt to mitigate the potential risks.

On SNS however, the relationship between risk and harm is not so easy to determine. Many negative online experiences go unreported, and therefore, it is not clear what people have actually encountered or experienced whilst online, let alone how it may have affected them (Livingstone, 2013). Furthermore, different people are likely to be affected differently by the incidents that they encounter online. For many individuals, online risks may have relatively little impact (Livingstone, 2013). For instance, data exploitation might not be realised by the individual or may seem quite trivial in the absence of explicit threats to an individual's finances or personal life. Exposure to

inappropriate content may elicit a sense of not caring, unless at the extreme end of the spectrum of public decency. Equally, individuals might feel self-assured and resilient enough to brush off instances of minor harassment or socially embarrassing gaffes. In such cases, the likelihood of an individual adapting their behaviour to reduce the threat of such online risks is likely to be low if the users do not perceive the risks to be particularly applicable to their own sense of wellbeing. Perceptions of risk are considered empirically in Chapter 6.

#### *2.4 Reasons for continued 'risky' online behaviour*

Over the past two decades, digital literacy rates in the UK have been on the increase in users young and old (Ofcom, 2015<sub>ab</sub>). Increased levels of digital literacy, i.e., possessing the technical and operational skills to use a range of ICT (Ng, 2012), have been shown to increase the opportunities open to an individual when engaging in online life (Livingstone & Helpser, 2010). However, with increased opportunity comes the potential for increased exposure to potentially negative online experiences (Livingstone & Helpser, 2010). So why do seemingly 'skilled' individuals expose themselves to such vulnerabilities?

##### *2.4.1 The 'privacy paradox'*

Despite apparent digital skills, might risky online behaviours be associated with a lack of risk awareness? Research has suggested this is not the case (Krasnova, Gunther, Spiekermann, & Koroleva, 2009; Moreno et al., 2009; Vanderhoven, Schellens, & Valcke, 2013). SNS users are routinely exposed to a myriad of online safety warnings through the popular press, educational initiatives, and SNS platforms themselves (Facebook, 2016; NSPCC, 2016; Safer Internet, 2016; Thinkuknow, 2016). Despite



these warnings however, SNS users continue to make themselves vulnerable to negative online experiences. A survey study of 506 SNS users by Acquisti and Gross (2006) found that gaining awareness of online privacy issues did little to change the self-disclosing behaviours of SNS users, with users believing that their own ability to control their information on the network, their ‘digital skills’, would be an effective means of safeguarding themselves against a potential data threat. Furthermore, a survey study by Christofides et al. (2009) looking at the privacy attitudes of 343 undergraduate Facebook users found that even though 76% of SNS users considered data privacy to be an important facet of online life, increased privacy control was only evident in those users that reported low levels of online trust.

The apparent mismatch between risk awareness and an individual’s online behaviour is often referred to as the “privacy paradox” (Barnes, 2006). The notion of a privacy paradox stems from the research of Alan Westin in the 1960’s and 70’s on privacy trends (Westin, 2003). In his work, Westin identified three types of individual: fundamentalists, unconcerned, and pragmatists. Privacy fundamentalists are said to be individuals who feel strongly about their personal privacy and will rarely relinquish control of their data, the unconcerned are those who readily provide their data to other individuals or organisations, and the pragmatists are those who demonstrate some concern for their privacy but are willing to relinquish control when faced with the prospect of attaining benefits (Draper, 2017). Research into SNS privacy attitudes (Acquisti & Gross, 2006; Christofides et al., 2009; Young & Quan-Haase, 2013) would suggest that many SNS users fall into the realms of being a privacy pragmatist, with users effectively ‘resigning’ themselves to the notion that online opportunities and benefits often come at the cost of their personal privacy (Turow, Hennessy, & Draper, 2015). As such when faced with an online opportunity that requires an

individual to reveal information or engage in ‘risky’ online practices, they will make a series of judgements to help them decide the extent to which they are prepared to relinquish control of their personal data (Dinev & Hart, 2006; Draper, 2017).

#### *2.4.1.1 Costs versus rewards*

As described in Chapter 1 (see Section 1.2.3.1, p.25), engagement with SNS can provide individuals with a means of regulating psycho-social needs (e.g., increasing one’s sense of social connectivity). To some engaging in risky behaviours can present an opportunity to satisfy such needs. Early theorisations of EVT (Burgoon & Jones, 1976), suggest that breaking expected norms of behaviour will provide higher levels of perceived positive rewards (e.g., access to social and symbolic capital), than norm conformism. For instance, individuals who want to gain conformity and support from a social group might self-disclose personal information or behave in a manner deemed ‘inappropriate’ to their wider network of contacts, in order to fit in with the desired ‘few’. Similarly, individuals who want to appear more popular, or be seen to be ‘friending’ the popular in-crowd, might be more likely to ‘friend’ socially spurious individuals (Postigo, González, Mateu, & Montoya, 2012). In such circumstances, Burgoon and Hale (1988) suggest that, “*violation of social norms and expectations may be a superior strategy*” (p. 58). In the offline world, such norm violations can be relatively controlled by the individual (e.g., smoking in front of peers, but hiding the cigarettes from parents). SNS, however, present a much more complex and visible social landscape, in which individuals violating norms risk alienating and causing tension with other social spheres on their contextually collapsed online network (Binder et al., 2012; Vitak, 2012).

Another perceived psycho-social benefit of engaging in online self-disclosure practices that can leave an individual vulnerable to negative online experiences, is the opportunity to gain increased levels of trust from their network. Quandt (2012) describes trust as something that is “*needed and occurs if actors (trustors) cannot or do not want to control the actions of other actors, but expect a certain action from these alteri (trustees).*” (p.8). Individuals will apportion a level of trust on to other individuals, organisations, or other aspects of society, based on their past experiences with similar individuals or circumstances. Therefore, access to higher levels of information can influence the way in which an individual will perceive the trustworthiness of another individual, organisation, or situation (Quandt, 2012). In the realms of SNS, the radical transparency of self-disclosed information (Joinson, 2008) provides individuals with a wealth of information with which to form trust-based opinions. Furthermore, the seemingly open nature of such platforms is seen to offer direct access to what is often perceived to be ‘authentic’ and ‘truthful’ information (Quandt, 2012). As such individuals may continue to engage in potentially risky self-disclosure practices in a bid to make themselves appear more authentic and trustworthy, and in doing so increase the opportunities available to them to gain social and symbolic capital (Bourdieu, 1984). Likewise, it stands to reason that an SNS user may consider another high disclosing individual on the platform to be more ‘trustworthy’ and therefore this may impact the likelihood of the user not only friending, but also sharing information with individual, even if they are a previously unknown or loosely connected social tie.

In the context of SNS, cost-reward judgements and subsequent online behaviours can be affected by whether an individual accurately perceives online risks and their potential severity. Some users may perceive risks to be apparent when there are none,

representing a more ‘fundamentalist’ approach (Draper, 2017) to SNS use and a misjudged hard-line approach to the online safety of themselves and others (e.g., their children). In contrast, some users might judge themselves to be not ‘at risk’ when the threat of susceptibility to negative online experiences is in fact high, leading to poorly-judged open and ‘unconcerned’ (Draper, 2017) approaches to online platform use that may in fact lead to potential risk and harm.

On a friend-based platform, inaccurate judgements of risk can result from the perception of online contacts being ‘friends’. On Facebook, users are encouraged to add online contacts to a ‘friends’ list. The use of the word ‘friend’ conjures up notions of reciprocal trust, loyalty and emotional support (Foucault et al., 2009), social attributes that to a Facebook user are unlikely to evoke perceptions of risk and harm. However, the term ‘friend’ is now commonly used to refer to a range of social contacts including family members, offline friends, and acquaintances, online only friends, commercial contacts, and even those whom users do not know but agree to befriend through either courtesy or in a bid to appear popular (Raynes-Goldie & Fono, 2005). Attempts by users to differentiate between a ‘friend’ and potentially troublesome individual, are likely to become increasingly complex as the size and diversity of an individual’s online network increases (Binder et al., 2012) as users may not be able to accurately recall the users on their network or indeed how and why they are connected to them. As a result, individuals may not be able to make accurate cost-reward decisions based on their perceived knowledge of the social ties residing on their own networks, and as such they may inadvertently leave themselves vulnerable to negative online experiences.

Another way in which risk perception can be influenced is by optimistic bias. Optimistic bias theory states that individuals display a tendency to perceive negative

events as less likely and positive events as more likely to happen to them (Higgins, St Amand, & Poole, 1997). Individuals demonstrating optimistic biases typically project an attitude of ‘it won’t happen to me’ (Krasnova et al., 2009). Reasons posited for such attitudes include egocentricity, motivational causes (e.g., Higgins et al., 1997), and the third-person effect (TPE; Davison, 1983). The TPE is a theoretical framework, which suggests that individuals perceive mass communication media to have a greater effect on others than on themselves (Davison, 1983). In terms of SNS, the TPE is said to create a discrepancy in self-other perceptions in terms of the consequences of online behaviour, with individuals being more likely to attribute the negative effects of online life to others (Debatin et al., 2009). The TPE has been evidenced in both adult and adolescent SNS users (Debatin et al., 2009; Paradise & Sullivan, 2012; Tsay-Vogel, 2015). For example, Paradise and Sullivan (2012), in a study of 357 undergraduates, found that when asked to estimate the negative effects of Facebook, participants were more likely to rate ‘others’ (e.g., younger people and/or friends on their network) as being more likely to experience negative online experiences than themselves. When faced with the threat of a myriad of potential negative online experiences, optimistic bias and the TPE might therefore help to explain why some individuals view the cost of data privacy to be a justifiable means of reaping the perceived opportunities and psycho-social rewards of SNS. The present thesis considers the role of the TPE in respect of the relationship between SNS user age and perceived vulnerability to negative online experiences (see Chapter 6).

### *2.5 Who might be vulnerable to negative online experiences?*

The topic of user vulnerability is widely debated in the academic literature, with researchers keen to theorise on whether individuals with certain demographics and

offline circumstances are more likely to encounter harm when exposed to risky circumstances online than others (Fogel & Nehmad, 2009; Livingstone & Haddon, 2009; Sheehan, 1999; Staksrud et al., 2013; Wolak et al., 2007). The age and gender of SNS users are demographics that have been implicated in research into negative online experiences. Gender differences have been previously indicated in the rate of exposure to negative online experiences, with females reporting higher levels of exposure than their male counterparts (Jones et al., 2013). In addition, males have been found to be more likely to engage in poor conduct online than females (Aricak et al., 2008). Interestingly, females have also been shown to display more pro-active data privacy measures when engaging online (Hoy & Milne, 2010).

In terms of age, at present much of the research into negative online experiences has focussed its attention on adolescent users (Livingstone et al., 2011; Livingstone & Smith, 2014; Staksrud et al., 2013; Wolak et al., 2007). A possible explanation for this is that engagement in risky behaviours (online and offline) is said to peak between the ages of 12 and 17 years, during the period of adolescence (Baumgartner, Valkenburg, & Peter, 2011). Associations have been made between teenagers and a range of offline risk taking activities including drug use, alcohol consumption, smoking, school truancy, and unsafe sex (Benthin, Slovic, & Severson, 1993; Boyer, 2006; Steinberg, 2008). In terms of SNS, associations have been drawn between adolescents and risky online behaviours such as oversharing of information, accumulating large unmanageable networks, and connecting and interacting with unknown or spurious contacts (Livingstone et al., 2011; Livingstone & Smith, 2014; Staksrud et al., 2013; Wolak et al., 2007).

Reasons for higher levels of adolescent risk behaviours (Arnett, 1992) have been attributed to a range of social-developmental factors including developmental

immaturity, egocentrism (i.e., a belief in one's own sense of uniqueness), and sensation-seeking (i.e., the need for novelty and excitement; Green, Krcmar, Walters, Rubin, & Hale, 2000; Zuckerman, 1994). Indeed, research has indicated that sensation-seeking, which tends to peak around the period of mid to late adolescence, is a predictor of risk taking activities, with teenage boys displaying significantly higher levels than girls of a similar age (Newcomb & McGee, 1989). Furthermore, research into SNS use amongst adults, has indicated that higher levels of sensation-seeking are evident in predicting users of Facebook when compared to non-users of the platform (Sheldon, 2012).

The perception of adolescents being at potential risk on SNS is not constrained to academia, with parents and young people themselves expressing concern. A large national survey of UK social media users and their perceptions of online life demonstrated that over 50% of parents surveyed were so concerned about their adolescent children engaging with age-inappropriate material, being contacted by strangers, and oversharing personal information, that they regularly talked to their children to discuss the potential risks (Ofcom, 2015<sub>b</sub>). Furthermore, a survey of young social media users for the NSPCC Net Aware project (2014) showed that 58% of young people think that engaging in Facebook can be risky, citing stranger danger, lack of privacy, and hurtful comments as top of their concerns.

Online vulnerability, however, is not merely the domain of a young user. While it is estimated that 40% of UK online adults feel 'very confident' in their ability to remain safe online (Ofcom, 2015<sub>a</sub>), there is a growing interest in the negative impact that social media sites might have on adult wellbeing (e.g., Bevan, Ang, & Fearn, 2014; Chen & Lee, 2013; Kross et al., 2013) and the potential susceptibility of adult users to negative online experiences (Kwan & Skoric, 2013; Shelton & Skalski, 2014). A

qualitative study by Fox and Moreland (2015) exploring the ‘dark side’ of adult Facebook use (N = 44) indicated that adults engaging with the site often experienced negative emotions and were regularly exposed to a range of risks such as privacy violations and inappropriate content. Furthermore, many adults reported feeling pressured to log on and interact with the site due to offline psycho-social factors such as FOMO. The age and gender of SNS users will be considered throughout the thesis.

The offline psycho-social wellbeing of an individual has also been implicated in online user vulnerability. As outlined in Chapter 1 (see Section 1.2.3.1.1, p. 28), individuals who are low in self-esteem have been shown to use SNS as a means of boosting their sense of wellbeing by regulating perceived psych-social needs deficits (Gonzales & Hancock, 2011; Steinfield et al., 2008; Valkenburg et al., 2006). Low self-esteem has been linked to a number of potential risk-inducing behaviours such as an increased likelihood to develop problematic and potentially addictive SNS usage patterns (Kuss & Griffiths, 2011) and attempts to increase social popularity through online friending and disclosure habits (Mehdizadeh, 2010; Zywicki & Danowski, 2008). A study by Forest and Wood (2012) looking at the motivations and consequences of SNS use amongst people with low self-esteem showed that sites such as Facebook presented a ‘safe’ and appealing place to connect with others, self-disclose and boost perceptions of self-worth. As a result, SNS users with low offline self-esteem were found to spend more time online. However, the findings also highlighted the tendency of individuals with low self-esteem to behave in a much more negative and potentially detrimental manner, including making negative and inappropriate posts, due to a misjudged need to maintain a sense of self-protection by effectively pushing other SNS users away. This research will consider the relationship between an SNS user’s self-esteem and their reported exposure to negative online experiences (see Chapters 4, 5, and 9).



It has been suggested that the relationship between an individual's psycho-social wellbeing (i.e., level of offline self-esteem) and SNS use, is likely to be mediated by offline social anxieties such as FOMO (Przybylski et al., 2013). As described in Chapter 1 (p. 29), FOMO is characterised by SNS users exhibiting an overwhelming fear that other people are leading more interesting lives than themselves (Przybylski et al., 2013). A form of social comparison, FOMO is said to drive an individual's desire for SNS use in a bid to regulate psychological needs and boost perceptions of wellbeing. Research into the potential impact of FOMO on social media users, while limited, has suggested potential associations with deficits in mental wellbeing, attention, device checking, and stress (Baker et al., 2016; Beyens et al., 2016; Przybylski et al., 2013). While the current body of research does indeed support the mediating role of FOMO in the relationship between offline psycho-social deficits and potentially problematic SNS use (Przybylski et al., 2013; Oberst, Wegmann, Stodt, Brand, & Chammara, 2017), at present detailed consideration of how FOMO might impact on a user's online behaviours and subsequent susceptibility to negative online experiences is lacking.

The present thesis argues that, aside from mere intensity of use, an association between FOMO and specific psycho-social regulating online behaviours (e.g., self-disclosure and online friending) is highly plausible. Attempts to counteract the effects of FOMO (to avoid anticipated social ostracism, as discussed in Chapter 1, p.30) and potential deficits in offline psycho-social wellbeing (e.g., low levels of self-esteem) are likely to put individuals at greater threat of exposure to online risk and psychological harm. This thesis will consider whether this might be related to higher levels of online data disclosure and the accumulation of large, diverse networks of online contacts (known and unknown) with whom the SNS users share their data. FOMOs role in these online

behaviours and potential negative online experiences needs clarification. Does it make a user more susceptible to negative online experiences, and if so how?

## *2.6 Researching negative online experiences: online methods*

The vast majority of research has utilised survey-based methods in a bid to find potential associations between SNS use and potential areas of risk and harm (Debatin et al., 2009; Fogel & Nehmad, 2009; Keipi, Oksanen, Hawdon, Näsi, & Räsänen, 2015; Kwan & Skoric, 2013; Livingstone & Haddon., 2009; Livingstone et al., 2011; O'Dea & Campbell, 2011; Sengupta & Chaudhuri, 2011; Staksrud et al., 2013). Survey-based methods are a well-established means of gaining empirical data in psychology. Survey-based data collection affords a number of advantages, including being relatively easy to administer to large groups of participants and providing the researcher with the ability to collect a broad range of data. A major limitation of survey-based methods when researching SNS is that they cannot provide an accurate account of an individual's SNS use. Factors such as time online, network size, and level of self-disclosure are driven by the user's ability to provide estimates of the required data (Binder et al., 2012; Fogel & Nehmad, 2009). For this reason, a number of researchers have looked towards exploiting the SNS technology itself to gain a more accurate and unbiased representation of online life.

One method of gathering data from SNS technology is to combine survey data with a review of the content displayed on SNS users' profiles. A study looking at the impact of self-presentation on the risk of cyberbullying by Dredge et al. (2014) utilised such a combined method. They initially gathered survey data from 316 Facebook users (15 – 24 years old) in which they measured user demographics, cyberbullying

victimisation, and peer relationships. The researchers then combined the survey-based results with data derived from an analysis of 147 online user profiles in which the type, content, and valence of self-disclosures posted on the profile were coded. Use of profile content has also been used in studies looking at social tension on SNS (Binder et al., 2012), user personality (Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011), and profile photographs (Hum et al., 2011).

Appraising the profile content of SNS users' profiles provides a valuable resource to researchers in terms of being able to gain a more accurate picture of online self-disclosure habits. However, accessing self-disclosed content on user profiles presents a number of ethical complexities (Zimmer, 2010) regarding user consent and privacy (in terms of both the profile holder and the friends depicted on the profile page) and the data policies of the networks themselves (Facebook, 2016c). Furthermore, analysis of profile content provides little in the way of being able to assess the actual structural composition of the network.

Another means of exploiting the technological capabilities of the SNS platforms is to consider the way in which individuals are structurally connected on the networks. Friendship lists are a common feature of many online SNS, including Facebook. Such lists often contain an indication of mutual friendships within a network, detailing all of the connections that a profile holder and their 'friends' have in common, and thus provide a means of allowing researchers to gain an accurate overview of not only the size of the network but also the structure of the social spheres contained within. In common with profile content methods, the use of online friendship data is bound by strict platform data policies (Facebook, 2016c) and ethical considerations (Larsson, 2015; Zimmer, 2010). Researchers must respect the privacy of both the SNS user and their connections when handling friendship data. However, whereas the appraisal of

profile content might involve researchers gaining access to a whole host of highly sensitive information, friendship lists provide a much less invasive means of network analysis. Friendship data and adherence to platform data policies is covered in more detail in Chapter 3 (Section 3.6.2, p. 147).

From a research perspective, the analysis of friendship data has a long-established history in social psychology. Research using self-reported offline and online friendship networks has been used to consider areas such as personal relationships (Furman & Buhrmester, 1985), adolescent health (Simpkins, Schaefer, Price, & Vest, 2013), and the association between online network size and psycho-social wellbeing (Manago et al., 2012). Self-reported networks have in the past been bound by a participant's ability to recall their connections making it difficult for researchers to gain an insight into the inner working of a full social network. However, the ability to download such data direct from a profile holder's SNS account now provides researchers with an excellent opportunity to analyse much larger and intricate networks that ever before possible. Some attempt has been made to utilise automated friendship data in psychological studies. Research by Brooks et al. (2014) explored social support mechanisms associated with ego-centric online networks using a combination of data derived from Facebook friendship network lists and self-reported measures of online activity for 235 USA based university employees. At present, such methods have not been applied to the study of online negative experiences. The present research will implement such methods in a bid to gain a clearer perspective of the factors that might predict such experiences.

## 2.7 The present research: a conceptual framework

The overall aim of the thesis is to consider how the offline psychological characteristics of an SNS user (i.e., their vulnerabilities), their online opportunities and behaviours (e.g., SNS use, self-disclosure), and the characteristics exhibited on their online networks (i.e., the number and type of social capital they encounter online), are related to an individual's experience and perception of negative online experiences (i.e., the risks and harms they might be exposed to). Figure 2.1 shows the conceptual framework for the present thesis, derived from the theoretical evidence outlined in Chapters 1 and 2.

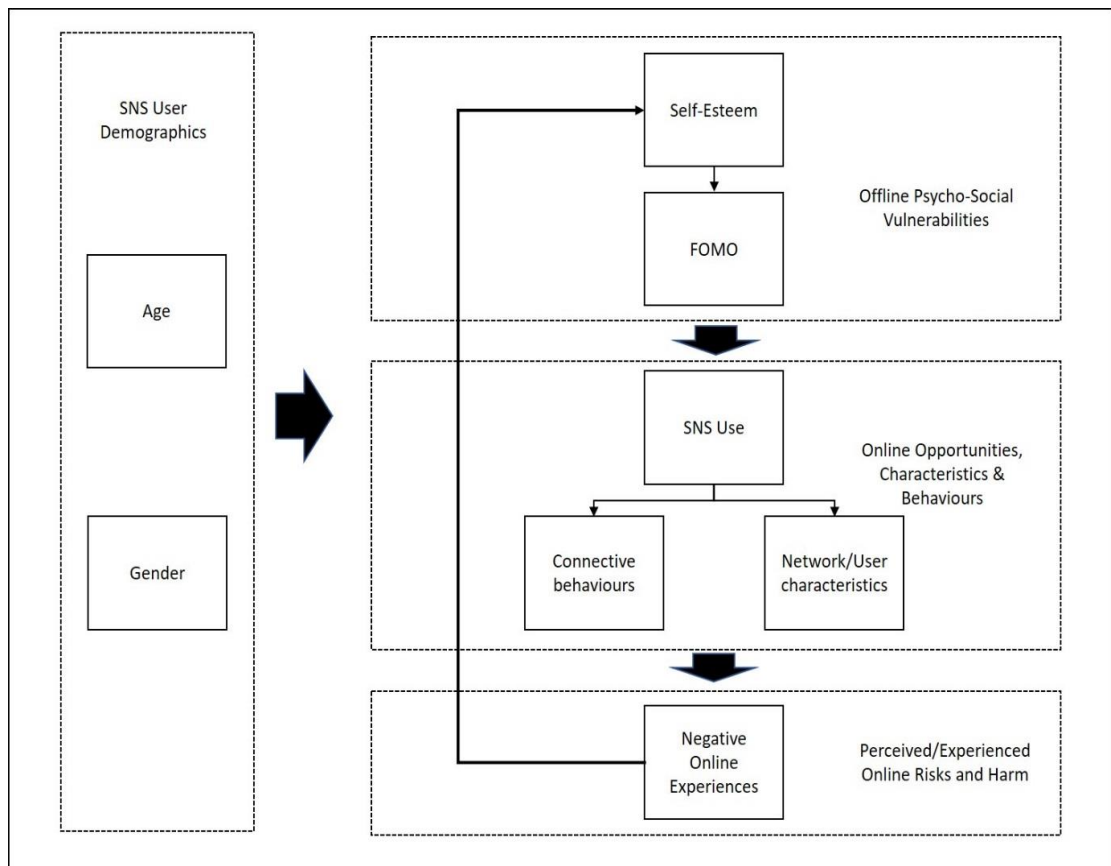


Figure 2.1 Conceptual framework for the present research

The theoretical underpinnings associated with this research indicate that SNS users displaying offline psycho-social vulnerabilities, such as low self-esteem, can be expected to use ego-centric online platforms to enhance their own self-perceptions and

perceived levels of social capital, and in doing so regulate psycho-social needs deficits. SNS such as Facebook provide individuals with a host of opportunities, such as general interaction with the site (i.e., use), and opportunities to engage in connective behaviours such as self-disclosure of information and connecting to online ‘friends.’ However, such opportunities are not without risk, and the way in which users perceive or indeed experience such negative online experiences might leave them susceptible to experiencing psychological, reputational or even physical harm. At present research would suggest that psycho-social motivated SNS use is mediated by an individual’s offline social anxieties (e.g., FOMO), and that the need to alleviate such social anxieties might draw SNS users into a spiral of potentially risky online behaviour (Przybylski et al., 2013; Williams, 2009). Limited evidence, based on adolescent mobile phone use, also suggests that social anxieties mediate the relationship between psycho-social vulnerabilities and negative online experiences (Oberst et al., 2017). Furthermore, an individual’s age and gender might play a role in not only their psycho-socially motivated use of SNS, but also the way in which they behave online, and perceive or indeed report negative online experiences (Jones et al., 2013).

The conceptual framework of this thesis is drawn from current research. However, an in-depth exploration of how these factors fit together is lacking. It is not enough to merely show that individuals with low self-esteem and potentially suffering the effects of FOMO use an SNS more frequently. Researchers need to gain an understanding of how the expected increases in SNS use might affect the online behaviours exhibited by users of these sites and how these behaviours might ultimately impact on an individual’s exposure to and/perception of negative online experiences. The present thesis therefore, sets out to explore and expand upon the relationships set out in the

conceptual framework. In particular, this thesis considers the potential mediating role of FOMO, and the relationship between key online behaviours and an individual's susceptibility to negative online experiences. In doing so, the thesis considers not only the characteristics of the SNS users themselves, but also the characteristics of the networks in which they reside and the people they connect to. Furthermore, the thesis utilises a mixed methods approach to data collection and analysis, drawing on a combination of self-reported and digitally derived data to provide a novel approach to answering the following research questions:

RQ1. Does FOMO influence an ego-centric SNS user's reported exposure to negative online experiences?

RQ2. Does FOMO influence the rate of connective behaviours (perceived and actual)?

RQ3. Do psychologically vulnerable users demonstrate an increased capacity to enter a potentially detrimental spiral of online behaviour over time?

RQ4. Does the accumulation of large, diverse online networks influence the reported rate of negative experiences online?

RQ5. Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?

## *2.8 Chapter summary*

The present chapter has outlined several online social and data risks and shown how these might be implicated in causing detriments to an individual's psychological,

reputational, and physical wellbeing through engagement with SNS and associated behaviours of self-disclosure and friending. The negative experiences discussed complement those used in existing survey-based attempts to capture exposure to online risks and harm (Binder et al., 2012), and as such will form the basis of the self-report measures of negative online experiences used in this research (see Chapter 3, p.107 & p.120). The chapter has also demonstrated how user demographics (e.g., age and gender), offline psych-social motivations (e.g., self-esteem), and social anxieties (e.g., FOMO) are thought to impact on an individual's online use, self-disclosure, and friending behaviours and subsequently influence their level of susceptibility to a range of potential negative online experiences. Finally, the chapter has outlined the contextual framework for the thesis. Building on the literature presented in Chapters 1 and 2, the framework provides an overview of how the factors identified will be considered in the present thesis and the research questions that will be used. The factors outline in the contextual framework will be discussed and operationalised in the methods (Chapter 3) and empirical sections of the thesis (Chapters 4 to 9), along with a more nuanced discussion of the methods used to test the research questions.



## **Chapter 3: Methods**

### *3.1 Introduction*

As previously described in Chapter 1 (see Section 1.2.3, p.23), engagement with SNS platforms offers users many opportunities to address psycho-social needs deficits through the accumulation of both perceived and actual social capital. SNS platforms, such as a Facebook, provide individuals with access to social connectivity, informational resources, and identity management via common online behaviours such as self-disclosure and online friending. However, participation in these opportunities is not necessarily a positive experience for all, with the literature highlighting how for some, such opportunities, might in fact result in higher levels of vulnerability to negative online experiences (see Chapter 2, Section 2.3, p.60). It is the intention of the remainder of this thesis, to test the extent to which an individual's exposure to and/or perception of these negative online experiences, might be associated with their offline user vulnerabilities, their online behaviours and the characteristics of both the users and the networks in which they reside. The present chapter provides a methodological overview of the research. The chapter begins by outlining how the research questions posed at the end of Chapter 2 (Section 2.7, p.92) translate to more specific research hypotheses. The chapter then describes the methods of data collection and analyses used in the empirical chapters of this thesis. Furthermore, the chapter demonstrates how the factors identified in the conceptual model, described in Chapter 2 (Section 2.7, p.92), have been operationalised, with a description of the sample and measures used in the empirical chapters provided.

### *3.2 Outlining the research hypotheses*

The five core research questions of this thesis consider the role of offline psycho-social vulnerabilities, online behaviours, and user/network characteristics in respect of a SNS user's perception of and exposure to negative online experiences. In this section, an overview of how these research questions translate into testable research hypotheses will be provided.

#### **RQ1: Does FOMO influence an ego-centric SNS user's reported exposure to negative online experiences?**

FOMO represents a form of social anxiety, an offline vulnerability that has been previously shown to mediate the relationship between offline psycho-social wellbeing (e.g., self-esteem) and SNS use (Przybylski et al., 2013). Higher levels of SNS use provide individuals with a range of online opportunities, including access to online social connections, informational resources, and the facility to manage one's reputation online. However, with increased opportunity also comes the possibility that individuals may find themselves exposed to higher levels of negative online experiences. At present, the association between FOMO and such experiences remains untested for users of online SNS platforms like Facebook. The present thesis, therefore, aims to test the following hypotheses:

*H1.1: Individuals with higher levels of FOMO will report higher levels of exposure to negative online experiences.*

*H1.2: FOMO will mediate the relationship between a Facebook user's offline psychological vulnerability and their reported exposure to negative online experiences.*

**RQ2: Does FOMO influence the rate of connective behaviours (perceived and actual)?**

It has been suggested that higher levels of social anxiety (e.g., FOMO) might result in an increased desire to engage in psycho-social needs regulating behaviours (Przybylski et al., 2013). In the case of Facebook, individuals can attempt to regulate their psycho-social needs by engaging in behaviours that can seemingly boost their perceived and/or actual levels of social capital, such as self-presentation (via self-disclosures) and online friending. Higher levels of SNS use have been previously implicated in higher rates of such connective online behaviours. It is the intention of this thesis to consider whether SNS use alone (as some deterministic approaches to Cyber-Social Psychology would have us believe) can contribute to higher rates of connective behaviour, or whether an individual's social anxieties might in fact be driving the way in which people act online. The present thesis will therefore test the following hypotheses:

*H2.1 Individuals with higher levels of FOMO will report higher levels of connective behaviours (e.g., self-disclosure and online friending).*

*H2.2 SNS use will mediate the relationship between FOMO and an individual's connective behaviours.*

*H2.3 SNS use and connective behaviours will mediate the relationship between FOMO and negative online experiences.*

**RQ3: Do psychologically vulnerable users demonstrate an increased capacity to enter a potentially detrimental spiral of online behaviour over time?**

Making a connection between an individual's offline psychological vulnerability (e.g., low self-esteem) and potentially problematic online experiences has been alluded to previously via cross-sectional means (see Chapter 2, p.86). There is however, a paucity of longitudinal research in the field. An important aim of this research is to explore how the combination of an individual's offline psycho-social vulnerabilities (e.g., self-esteem and FOMO) might affect their online behaviours and reported exposure to negative online experiences over time. In doing so, the thesis will consider whether psychologically vulnerable individuals may inadvertently descend into a spiral of detrimental behaviour. Adopting a longitudinal approach will allow the research to test the role of psycho-social vulnerabilities as both predictors and outcomes, and in so doing provide an important and original contribution to our understanding of the motivations and implications associated with online life. The present thesis therefore, will test the following hypotheses:

*H3.1 Individuals with negative psycho-social motivations will report higher levels of SNS use over time.*

*H3.2: Individuals with negative psycho-social motivations will report higher levels of connective behaviour over time.*

*H3.3: Individuals with negative psycho-social motivations will report higher rates of exposure to negative online experiences over time.*

*H3.4 Individuals with higher levels of SNS use and connective behaviours will report higher levels of psycho-social vulnerability over time.*

*H3.5 Individuals with higher levels of SNS use and connective behaviours will report higher levels of exposure to negative online experiences over time.*

*H3.6 Individuals with higher levels of exposure to negative online experiences will report higher levels of negative psycho-social wellbeing over time.*

**RQ4: Does the accumulation of large, diverse online networks influence the reported rate of negative experiences online?**

With the fourth research question, this thesis will cast a spotlight on one aspect of a user's online connective behaviour: online friending. Large online networks can harbour a diverse array of social connections (Binder et al., 2012). Diverse SNS networks are prone to contextual collapse (Vitak, 2012), as the online platforms tend to, by default, pool individuals into one homogenous network of intermingling and overlapping social spheres. Network characteristics of this type have in the past been the subject of research into online tension (Binder et al., 2012), surmising that large, diverse networks render users at the mercy of not only unmanageable but also unimaginable (Marwick & boyd, 2011) networks of online connections. As such the information and interactions of an individual online, will not only be visible to, but also likely to be judged, by an audience far larger and more diverse than a user might have originally intended. This could leave individuals vulnerable to a host of potential negative online experiences (see Chapter 2, Section 2.3, p.60). The aim of this thesis is to advance the research into social network size and diversity, by moving away from an over-reliance on self-report data to capture such characteristics. Online platforms have the facility to provide a host of digital data to better represent the online behaviours and network characteristics of their users. This thesis will therefore,

combine digitally derived data with user self-report data to gain a clearer understanding of online friending and its potential relationship with negative online experiences. The present thesis will test the following hypotheses:

*H4.1 Digitally reported network size will positively predict exposure to negative online experiences.*

*H4.2 Diversity of social capital will positively predict exposure to negative online experiences.*

*H4.3 Diversity in the digitally derived structure of SNS will positively predict exposure to negative online experiences.*

*H4.4 Diversity in the online network (social and structural) will mediate the relationship between digitally reported network size and exposure to negative online experiences.*

**RQ5: Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?**

SNS platforms are used by a diverse array of users. Differences in demographics, such as age and gender, have been found in relation to individuals motivations for use, experiences, and perceptions of online life (see Chapter 1, from Section 1.2.2, p.22). Furthermore, the characteristics of the social connections and networks to whom users connect have been scrutinised. The final research question that this thesis considers is the role that these characteristics might have, not only on an individual's negative experiences, but also to consider the role that some might play on an individual's

perceptions of vulnerability towards themselves and others. Using both self-reported and digitally derived analyses, the thesis will test a range of characteristic based hypotheses.

The first set of hypotheses that will be used to address RQ5 will centre around the characteristics of the participants themselves. While some age and gender differences have been found in previous research into SNS use and negative online behaviour (see Section 2.5, p. 84), it is important that this thesis not only acknowledges that such differences are very likely to occur, but also seeks to explore in detail the role that such demographics might play on the empirical models tested. For instance, in line with Davison's (1983) theory of the TPE, will demographic distances in age and gender affect perceptions of negative online experience? For this reason, general hypotheses, have been provided that reflect the research's intention to explore these characteristics and their overarching impact on an individual's perception and/or exposure to negative online experiences. In addressing these general hypotheses, the thesis will be able to take a considered approach to establishing just how and why such demographics might play a role across all of the empirical chapters presented. It is therefore hypothesised that:

*H5.1 The age and gender of SNS users will influence the reported level of exposure to negative online experiences.*

*H5.2 The age and gender of SNS users will influence their reported self-perceptions of vulnerability to negative online experiences.*

*H5.3 The age and gender of SNS users will influence their reported third-person perceptions of vulnerability to negative online experiences.*

The second set of hypotheses used to test RQ5, consider the characteristics of the online connections that a user has within their network. The hypotheses described are reliant on the research combining both self-report and digitally derived data. The first two hypotheses in this set (H5.4 & H5.5) reflect the intention of this thesis to address the role that connecting to other individuals who might display non-norm user/profile characteristics (i.e., users with a misclassified, incomplete or disguised online identity) and/or behaviours (i.e., posting socially contentious content) might have on reported online experiences. As described in Chapter 2 (Section 2.3.1.1.4.2, p.75), non-standard user/profile characteristics are likely to render an account less salient in an SNS user's network, increasing the possibility of potential exposure to negative online experiences. In contrast, non-norm behaviours are likely to be more salient, violating an individual's social and behavioural expectations, especially if the user is significantly known to them in the offline world (Burgoon & Jones, 1976). As such, online interactions or incidents involving a non-norm individual and/or profile are likely to be more memorable. It is therefore hypothesised that:

*H5.4 Individuals with networks containing higher levels of users exhibiting non-standard user/profile characteristics will report higher levels of exposure to negative online experiences.*

*H5.5 The presence of non-standard user/profile characteristics will mediate the relationship between the size and diversity of an individual's online network and their reported exposure to negative online experiences.*

*H5.6 Individuals will attribute higher levels of negative online experiences to interactions with significant known individuals.*



*H5.7 An individual's offline interactions with an online connection will influence the relationship between Facebook interactions and reported instances of negative online experiences.*

The final hypothesis that will be used to test RQ5 will consider the impact of connecting to socially popular individuals. Individuals using SNS platforms to increase their social capital (perceived and/or actual) and may connect to users whom they deem to be well connected in order to increase their own social standing (see the discussion on symbolic capital in Chapter 1, p.34), even if that user exhibits socially spurious behaviour. The use of digitally derived data in this thesis makes the accurate testing of social popularity in a network a possibility. It is therefore hypothesised that:

*H5.8 Individuals who connect to socially popular others online will report higher levels of exposure to negative online experiences.*

### *3.3 Research methodology and design*

To address the research questions and hypotheses, the research has adopted a multi-methods research design combining both cross-sectional and longitudinal datasets to capture psycho-social vulnerabilities, reported exposure to and perceptions of negative online experiences, online behaviours, and network dynamics using self-reported and digitally derived data. A series of linked datasets and analyses have been used to address the questions and hypotheses posed. An overview of how these questions and hypotheses relate to the datasets and methods used during the research is provided in Table 3.1.

*Table 3.1 Mapping research questions to methods and data*

Research Question (RQ)	Hypotheses	Data collection method(s)	Dataset(s)	Methods of analysis used	Empirical chapters
1. Does FOMO influence an SNS user's reported exposure to negative online experiences?	H1.1 H1.2	Online survey	Cross-sectional (N = 506) Longitudinal (N = 175).	Structural equation modelling (SEM)	4 & 5
2. Does FOMO influence the rate of connective behaviours (perceived and actual)?	H2.1 H2.2 H2.3				
3. Do psychologically vulnerable users demonstrate an increased capacity to enter a potentially detrimental spiral of online behaviour over time?	H3.1 H3.2 H3.3 H3.4 H3.5 H3.6	Online survey	Longitudinal (N = 175).	SEM	5
4. Does the accumulation of large, diverse online networks influence the reported rate of negative experiences online?	H4.1 H4.2 H4.3	Online survey Digital data extraction task	Combined self-report and digitally derived dataset (N = 177)	Mediation analysis (MA)	7 & 8

5. A	Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?	H5.1	Online survey Digital	All datasets	SEM	4, 5, 6, 7,
				data extraction task	MA	8 & 9
				Network appraisal	Multilevel modelling (MM)	
		H5.2	Online survey	Cross-sectional (N=506)	Multivariate	6
		H5.3		Longitudinal (N = 90).	analysis of variance (MANCOVA)	
		H5.4	Online survey Digital	Combined self-report	MA	8 & 9
		H5.5	data extraction task	and digitally derived dataset (N = 177)	MM	
			Network appraisal	Combined multilevel dataset (online connections = 5113, SNS users = 52)		
		H5.6	Online survey Digital	Combined multilevel	MA	9
		H5.7	data extraction task	dataset (online	MM	
		H5.8	Network appraisal	connections = 5113, SNS users = 52)		

When considered individually, each of the methods of data collection and analyses used in the present thesis can offer interesting insights into the online lives of ego-centric SNS users. However, a key strength of the present thesis is the combination of these methods, and the creation of combined datasets that allow for a greater understanding of not only how individuals behave online, but also their offline psychosocial motivations, the characteristics of the individuals involved in the networks (both the user and their contacts), and their perceptions and experience of negative online experiences. What follows is a detailed account of the methodology used in the present thesis, providing detail of the research sample, methods of analysis, modes of data collection, and the measures used.

### *3.3.1 Operationalising the outcome variables: negative online experiences*

The present thesis addresses both an individual's exposure to negative online experiences and their perceived vulnerability to such events. In both cases, the reporting of such information is reliant on an individual's personal perceptions of the different risks (see Chapter 2, Section 2.3.1, p.61 for an overview of online risks) associated with the negative online experiences and their capacity to cause the individual harm (Livingstone, 2013). Risk perceptions have been defined by Sjöberg, Moen, and Rundmo (2004) as being a subjective rating, combining the probability of a fearful incident occurring with an individual's overall level of concern for the consequences. An individual's perception of risk is likely to be influenced by the degree of severity that the risk holds, the susceptibility of the individual (e.g., their psycho-social vulnerabilities) to the risk, and the personal relevance of the risk to the individual (Slovic, 2000). As such, ratings provided by individuals are likely to differ depending on a range of factors, including their age, gender, and psycho-social

vulnerabilities (Slovic, 2000). In the present thesis, the subjective nature of such risk perceptions associated with negative online experiences is addressed by considering a range of user and network characteristics, including general user demographics, psycho-social vulnerabilities, network features, and user behaviours.

The operationalisation of negative online experiences in the present thesis is represented using four complementary outcome variables. In all cases the measures are self-reported and therefore prone to the subjective influences of individual risk perceptions. In Chapters 4, 5, 7, and 8, the outcome variable is a self-reported measure of prior exposure to negative online experiences. In Chapter 6, two outcome variables are tested: personal perceptions of online vulnerability and third-person perceptions of online vulnerability. Rather than measuring exposure to previous risks, these measures provide an indication of an individual's perceived probability of a negative online experience occurring to themselves and others. Finally, in Chapter 9, negative online experiences are operationalised as disagreeable / anti-social behaviour that an individual has perceived others to have been involved in on their network. The disagreement measure, whilst complementing the exposure and perceptions variables, provides an opportunity to consider negative online experiences at a network level rather than merely a single user level. A full description of how these measures have been used and presented in the thesis is provided later in this chapter (Section 3.6.1.2, p.120).

### *3.4 Research sampling procedure*

Research into SNS use and negative online experiences has predominantly focussed on adolescent and university aged participant groups (Jeong & Coyle, 2014; Livingstone, 2008; Staksrud et al., 2013). The present research endeavoured to collect

data from a sample of UK based Facebook users’ representative of the full age-range of possible Facebook users from 13 years to old age. A panel-based approach to sampling was used in an attempt to gain a demographically diverse sample of SNS users. Three panels of UK based participants were recruited to take part in the research. An overview of these panels is provided in Table 3.2.

*Table 3.2: Overview of participant panels*

Panel	Panel Name	Age Range	Location	Initial <i>N</i>
1	Adolescents	13–17 years	South East and East Midlands, UK	291
2	University students	18–21 years	Nottingham, UK	90
3	Online Adults	Over 21	UK	125

#### *3.4.1 Adolescent panel*

A convenience sample of 291 adolescents aged between 13 and 17 (School Years 9 to 12) were recruited from UK (East Midlands and South East) based secondary schools. Invitations to participate in the research were sent repeatedly to 15 to schools via post and/or email (see Appendix 2.1) over a four-month period. Schools were invited based on locality to the researcher’s university and/or existing staff contacts that the researcher had in schools in the Derbyshire, Nottinghamshire, and Greater London areas prior to the research taking place. Invitations were sent out to a range of different school types, including state funded secondary schools, academies, faith schools, and sixth form colleges. The range of school types invited reflected the intention of the

research to gain a demographically diverse sample of adolescents from across the two selected sampling areas of the country. Five schools agreed to participate in the research, providing formal consent from the Head-teachers. Participating schools represented a cross section of types, including three state-funded secondary schools (1 in the East Midlands, 2 in the South East), an academy (East Midlands), and one selective faith school (South East). The schools ranged in size from 774 to 2088 pupils and were socio-economically diverse with free school meal provision ranging from 5% to 30% (Tutor Hunt, 2016). Socio-economic diversity was desirable as it provided a means of potentially accessing students from a range of different types of household, and therefore students who might display different opportunities in terms of access to digital technology and SNS. Schools that did not agree to take part in the research either did not respond to the invitation or cited staff work-load as a reason to decline.

Selection of student groups for involvement in the research was at the discretion of the teaching staff. Selection of specific classes tended to be based on staff willingness and timetable availability. Due to the longitudinal nature of the research, schools also tended to select classes that would be least likely impacted by factors such as imminent exams. Access to class groups differed across the schools. One school provided access to two full year groups (Years 9 and 12), whereas, the other four schools provided access to discrete classes from Year 9 to 12. Head-teachers were able to select between opt-in or opt-out consent procedures for the online survey and digital data elements of the research (see Appendix 2.2 & 2.3 for opt-out and opt-in letters). All schools chose the opt-out consent strategy. Most schools justified this decision on the grounds that parents had already been informed and consented to pre-emptive participation in research studies at the beginning of each school year. Prior to data collection, all parents/guardians of students identified for research participation were sent

information and consent forms (see Appendix 2.2 & 2.3). No students were withdrawn from the study on the grounds of parental consent. Two emails were received from parents of the students requesting further clarification of the research design. This information was provided by the researcher to the satisfaction of both parents. Due to the more in-depth nature of the network appraisals task, the researcher ensured opt-in consent procedures were in place for all interested students (see Appendix 2.7). Prior to the network appraisal sessions, parental consent was provided for each student in the sub-sample.

#### *3.4.2 University student panel*

A convenience sample of 90 university students (19 – 21 years) were recruited from the undergraduate student population at Nottingham Trent University (NTU), UK. NTU has approximately 27,000 students enrolled across a wide range of courses. Students are representative of most socio-demographic facets of society. It was the intention of the researcher to attract interest from a diverse range of students from this population. Therefore, advertisements (see Appendix 1a) for the research study were placed on student noticeboards across the university. Online advertisements were also placed on the university intranet, university run Facebook pages, and on the Psychology department's online research participation scheme.

#### *3.4.3 Online adult panel*

An online sample of 125 adults from across the UK was recruited via online discussion forums and Facebook groups (see Appendix 1b for an example recruitment message). A full list of advertisement locations can be found in Appendix 1. Websites were selected on the basis of targeting different socio-demographic areas of society, for



instance, parenting groups (e.g., Netmums) and general interest / community groups on Facebook (e.g., full town or village groups representing a diverse range of user demographics). A website specialising in research participant recruitment was also used, although as it was in its infancy at the time it did not render many responses (approximately 5). Permission was sought from the website and/or Facebook group owners prior to advertising. A number of websites declined to advertise the research on the grounds that it was not within their policy to promote requests for research studies. Negative decisions were most frequent from sites that required individuals to become members, or Facebook groups that had participants numbering less than 100. In all cases, concerns regarding data privacy were cited. All participants recruited were over the age of 21 and residing in the UK at the time of the research. All participants were asked to provide their location of residence in order to verify their status as a UK Facebook user.

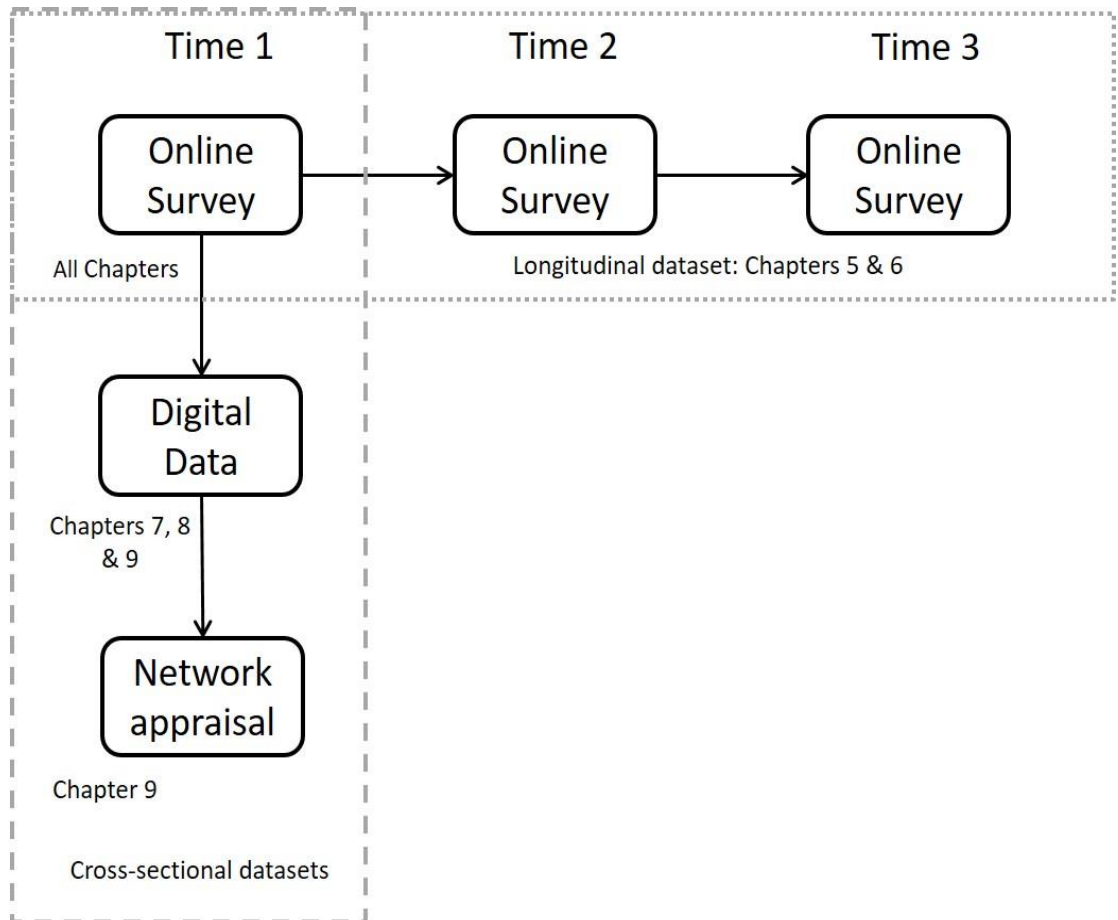
#### *3.4.4 Sample Limitations*

A common issue with research concerning online platforms, the present thesis included, is the representativeness of the samples used. With a target population of approximately 2 billion users worldwide, gaining a truly representative sample of Facebook users to reflect a ‘typical’ user group presents an onerous task. Ideally, a researcher would need access to a full list of UK based Facebook users from which to generate a random sample. However, Facebook data policies prevent this from being possible to all but the few with whom they have specific research partnerships. Time and/or monetary restrictions also render it difficult, especially in the case of non-funded postgraduate research, to obtain access to a truly diverse and random sample of participants via other means.

The present thesis has adopted a convenience sampling approach, in which participants have self-selected to participate in one or more elements of the study. Such a sampling method, whilst not uncommon in the realms of internet-based studies in Psychology (e.g., Binder et al., 2012; Debatin et al, 2009; Hollenbaugh & Ferris, 2014), does present a potential limitation in the present research. It is fair to say that the self-selected samples used in the present thesis, are not truly generalisable to the UK Facebook population, however, the recruitment of participants from different sampling sites does offer a degree of demographic diversity which makes the findings presented in this thesis nonetheless useful and insightful. Sample overviews for each of the datasets generated are provided in Section 3.6 (p.117) of this chapter.

### *3.5 Procedural overview*

Data collection for the research took place between April 2014 and December 2015. The methods of data collection used throughout the research are illustrated in Figure 3.1.



*Figure 3.1 Data collection design for the present thesis*

An initial secure online survey (Appendix 3), capturing offline psych-social vulnerabilities, SNS behaviours, and perceptions and reported exposure to negative online experiences, was administered to all participants taking part in the research. Consent and debrief information for all parts of the study can be found in Appendix 2. Participants completed between 1 and 3 rounds of the survey, at six-month intervals, depending on their willingness to take part in the different research time points. Participants taking part in the initial online survey were also invited to take part in a digital data collection task and network appraisal (Appendix 4 & 5).

School-based adolescent participants completed all online surveys and the network data collection in school-based ICT classrooms under the guidance of a member of

teaching staff. In establishments where network access to Facebook was restricted the schools were provided with the option of either: (1) submitting online survey data only or (2) arranging a face-to-face appointment with the researcher in which participants completed the activity on a mobile network enabled laptop. Undergraduate and online adult participants completed the surveys and network data collection remotely.

Following the first round of survey and digital data collection a small self-selected sub-sample from each panel was invited to participate in a follow-up social network appraisal study. For school-based adolescents and university undergraduates this task was completed face-to-face with the researcher. Adult participants completed an online version of the task remotely. The self-selected nature of the sub-samples used in the research, did prompt some concerns regarding participant biases in the variables measured. To check for significant biases in the sample, attrition analysis was performed on all datasets. Further details of this analysis can be found in Section 3.6.1.3.2.1, p.139.

A further procedural consideration, and potential limitation of the research, is the potential for research participation effects in the longitudinal elements of the research. It has been suggested that individuals taking part in research studies might experience perceptual changes as a consequence of their participation (MacNeill, Foley, Quirk, & McCambridge, 2016; Rodrigues, O'Brien, French, Glidewell, & Sniehotta, 2015). Longitudinal, psychological, survey studies, such as the one presented in this thesis, require participants to draw on their personal experiences and perceptions over a period of time (e.g., a year). Such studies therefore have the capacity to provide participants with time to consider their perceptions and understanding of the topics under investigation, by reflecting on the questions posed and the information (e.g., the age specific debriefs provided by this study) provided at each stage of the research. It

is therefore plausible that over time an individual may increasingly become more sensitised to the issues raised by the research, and ultimately alter their perceptions between the start and end point of their participation. Testing for consistency in self-report over time will help to determine whether such participant effects are pertinent to the present research.

### *3.5.1 Research Ethics*

All procedures conducted during this research followed appropriate ethical guidelines (BPS, 2009; BPS, 2012) and were approved by the NTU College of Business, Law, and Social Sciences research ethics committee (Approval Reference No. 2014/13).

#### *3.5.1.1 Participation incentives*

In return for their time, opportunities to gain incentives were offered to all participants. All participants were provided with the opportunity to enter into a prize draw to win online vouchers. In addition, university-based participants studying Psychology were also offered research credits via their institutional research participation scheme. The allocation of research credits to Psychology students was in line with the normal expectations of the student population, where research participation is used as a means of increasing engagement in the course.

The use of incentives is widely established in the academic research community (Singer, Van Hoewyk, Gebler, & McGonagle, 1999; Singer & Couper, 2008). While some have suggested that an incentive, such as a prize draw, might inappropriately coerce a potential participant into taking part (Wright et al, 2004), most hold the belief that it is an acceptable means of demonstrating appreciation for a participants' time and effort (Wiles, Heath, Crow, & Charles, 2005). To ensure transparency, details of

all incentives were clearly outlined prior to each round of data collection. This allowed each participant the opportunity to weigh up the costs and potential rewards of participating in the research in an informed manner. School-children also received verbal clarification of the research requirements and potential incentives, providing them with opportunities to discuss any issues with teaching staff.

### *3.6 Data collection methods and analysis*

A multi-methods approach to data collection was adopted throughout the research. This combined the use of an online survey, a digital data extraction task, and an appraisal of the characteristics of participants' online networks. The following sections provide an overview of the methods, the samples gained, and the measures used.

#### *3.6.1 Online survey*

The use of an online survey facilitated maximised flexibility in terms of distributed access and outreach to a variety of online SNS users. Each page of the survey was optimised for both desktop PC and mobile devices. Aside from the informed consent indicator, questions in the survey were not obligatory. This gave participants the ability to skip questions in the survey. While in some cases this enabled some participants to progress to the end of the survey without providing responses, the presentation of non-obligatory questions was in line with the ethical guidelines provided by NTU. Furthermore, the use of forced-response in online surveys has been associated with increased drop-out rates (Steiger, Reips & Voracek, 2007), a situation the present research wished to avoid. Piloting of the online survey was not carried out prior to the main data collection, as the majority of the survey measures were

established or mildly adapted versions of established scales. The validity and reliability of the scales were thoroughly tested using CFA and reliability analysis to ensure data quality.

#### *3.6.1.1 Confirmatory factor analysis (CFA) of self-reported scales*

The data quality of the online survey measures was an important consideration throughout this research. Prior to the analysis of the online survey data, the validity of individual latent constructs of the self-reported scales was first assessed. All analyses were conducted on the initial self-report sample ( $N = 489$ ), with constructs also tested for measurement invariance across all three self-report time points. Six scales were analysed: FOMO, Self-Disclosure, Negative Online Experiences, Self-Esteem, PPV (Personal Perceptions of Vulnerability), and TPV (Third Person Perceptions of Vulnerability). For full details of the measures and scales used please see Section 3.6.1.2, p.120. Four of the variables were derived from either established (FOMO, Online Vulnerability, Self-Esteem) or moderately adapted versions of existing scales (Disclosure). PPV and TPV were study specific but grounded in theory from previous research. Scale reliability was assessed using Cronbach's alpha to ensure the internal consistency of the scales for this dataset. An alpha co-efficient of  $> .7$  indicated good internal consistency (Cortina, 1993). Confirmatory factor analysis, using AMOS v.21, was conducted to assess the internal consistency and content validity of the latent constructs. All decisions regarding the appropriateness of item reduction and acceptability of factor structure for subsequent analyses in the empirical chapters were based on a combination of model fit statistics (see Section 3.6.1.4.2, p.144), modification indices, and critical ratios of the individual items. All CFA analyses were 95% BCI (Bias-corrected Confidence Interval) bootstrapped to increase the accuracy

of estimates. Table 3.3 summarises the final model fit statistics for each latent construct. A detailed account of the CFA analysis for each scale can be found in Appendix 7. Following the CFA analysis, latent constructs using parcelled factor loadings based on the CFA derived scales were used for SEM analysis of RQ 1 and 2 in Chapter 4 (see Appendix 8). All other empirical chapters used scale totals derived from average scores calculated using the CFA derived items.

*Table 3.3 Overview of final CFA fit statistics for latent constructs (N = 489; Male = 247, Female = 242)*

	<i>Cronbach's</i>	$\chi^2$ (df)	<i>CFI</i>	<i>RMSEA</i>	<i>TLI</i>	<i>SRMR</i>
	$\alpha$			[LL, UL]		
FOMO	.88	133.03 (33)*	.96	.08 [.07, .09]	.94	.00
Disclosure	.88	185.95 (48)*	.95	.08 [.07, .09]	.93	.00
Negative online experiences	.91	4.61 (3)	1.00	.03 [.00, .08]	1.00	.01
Self-esteem	.88	58.33 (33)*	.99	.04 [.04, .06]	.99	.01
PPV	.94	25.53 (7)*	.99	.07 [.04, .10]	.98	.03
TPV	.93	33.69 (9)*	.99	.08 [.05, .10]	.98	.03

\* $p < .05$ ; PPV = *Personal Perception of Vulnerability*; TPV = *Third-Person Perception of Vulnerability*; LL = *Lower Limit*; UL = *Upper Limit*.



### *3.6.1.2 Online survey measures*

The social networking online survey contained a battery of pre-established scales, study-specific measures and sample demographics (see Appendix 4). Analyses using these measures can be found in all empirical chapters of this thesis. The measures contained in the online survey are described as follows.

#### *3.6.1.2.1 Outcome variable*

*Negative online experiences:* Prior exposure to negative online experiences on Facebook was measured by six items derived by combining items (regarding criticism, social blunders, and gossip) from a scale previously used by Binder et al. (2012) and online risks previously identified by Debatin et al. (2009). The language of the scale items was simplified to reflect the wide-age range of the target sample. This was to ensure that all potential negative experiences could be fully understood by all users regardless of age or online experience. The situations described in the scale represent negative experiences complementing the content, contact, and conduct risks (Hasebrink et al., 2009) previously described in Chapter 2 (Section 2.3.1.1, p. 61), and as such provide a means of operationalising self-reported exposure to negative online experiences. Questions were designed to assess how frequently participants had personally experienced or seen others encounter a range of negative online experiences. All items presented to the participants, along with their factor loadings are presented in Table 3.4.

*Table 3.4: CFA derived item loadings for the self-reported negative online experience scale (N = 489; Male = 247, Female = 242)*

Item	B [95% BCI]	Standardised $\beta$	SE
1. Critical or hurtful comments	Removed due to multicollinearity with Item 3.		
2. Social embarrassment	1.00 [1.00, 1.00]	.76***	.03
3. Damaging gossip and rumours	1.13 [1.06, 1.22]	.83***	.04
4. Personal information being misused (e.g. shared without permission)	1.18 [1.07, 1.30]	.90***	.04
5. Content of a sexual or violent nature	1.04 [.93, 1.15]	.77***	.05
6. Unwanted advances, stalking or harassment online	.94 [.83, 1.096]	.77***	.05

B = unstandardized;  $\beta$  = standardised; \*\*\*p<.001

Responses to each item ranged from 1 (*Very rarely*) to 5 (*Very often*). The scale items produced an average score ranging from 1 to 5, with higher scores indicating higher levels of exposure to online vulnerability whilst on Facebook. Asking participants to consider both self and others in their responses was deemed necessary to gain a rounded perspective on the extent to which SNS users might be exposed to potentially detrimental online experiences in their everyday online life. Observing such risks among others on their network, while not a direct risk to the self, indicates network activity within their social sphere that might make it more likely for the user to eventually experience similar issues. The self-reported responses to negative online experience were used as the outcome variable for the analyses conducted in Chapters 4, 5, 6, 7, and 8, and offered a means of testing RQs 1, 2, 3, and 4. Full details of the CFA analysis for this scale can be found in Appendix 7. Factor loadings based on the CFA derived scales were used for SEM analysis of RQ1 and 2 in Chapter 4. All items

loaded strongly onto the latent factor ( $>.06$ ; Hair, Anderson, Tatham, & Black, 1998; Field, 2005). One item (item 1) was removed from the scale during CFA analysis due to multicollinearity with item 3. Scale reliability tests for indicated good internal consistency for a 5-item scale ( $\alpha = .91$ ). Chapters 5, 6, 7, 8, and 9 used a negative online experiences scale total constructed from the average score of the CFA derived items.

#### *3.6.1.2.2 Demographics and predictor variables*

*Sample Demographics:* General sample demographics addressed the age and gender (*0 for male; 1 for female*) of the participants. For the analyses presented in Chapters 5, 6, and 7, age was treated as a continuous variable. To better facilitate group-based analysis of user characteristics and the TPE (RQ5: H5.2 & H5.3) in Chapter 6, participant age was recoded into a 2-category variable: ‘Age-Group’ (*coded as 1 for school-based adolescents (13 – 17 years old) and 2 for adults (over 18 years old)*). The recoding of age into a dichotomous variable for this chapter provided a means of testing the plausibility of potential demographic group (adolescent vs. adult) differences previously alluded to in Chapter 2 (p. 84).

*Facebook Demographics:* Five items were used to gain an overview of the participants’ Facebook demographics. Items addressed the duration of the participants’ Facebook membership (*in years*), whether Facebook was their primary SNS (*yes/no*), their digital device preference (*mobile, PC, or tablet*), their Facebook logout preferences (*ranging from 1 “never” to 5 “always”*), and their Facebook privacy settings (*“anyone”, “only friends”, “different settings for different people”, or “don’t know”*).

*Motivation for Facebook Use:* Six items, adapted from a scale used by Ellison et al. (2007) to include direct references to Facebook, used to assess an individual's motivation for engaging in Facebook (e.g., "*To meet new people*"). For the purpose of this research, the motivations were used as single items to provide background sample context. Responses were given on a 5-point scale for each item ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Higher scores indicated higher levels of motivation for the specific reason for use stated.

*SNS Use:* A single item measure was used to assess an individual's daily use of Facebook. Responses were given on a 5-point scale ranging from 1 (*0-15 minutes*) to 5 (*Over an hour*). SNS use is an integral measure in this thesis, being used as a means of representing an individual's engagement with Facebook when addressing RQs 1, 2, and 3.

*Network Size:* A single item self-reported measure of estimated Facebook user network size. Responses were given as a self-reported numerical estimate. Self-reported network size provides a means of gaining an indication of the number of connections for all original members of the sample (N = 506). Self-reported network size is used in this thesis as a means of operationalising online friending behaviours (i.e., a connective behaviour) relevant to the testing of RQs 2 and 3 in Chapters 4 and 5.

*Profile Data:* A list of 15 -items (e.g., "*status updates*", "*email address*") typically displayed on Facebook profile pages were used to determine the magnitude of the participants' online data disclosure. Participants selected "*yes*" or "*no*" to indicate use on their page. Positive responses were summed up to provide an estimation of the total number (ranging from 0 to 15). Higher scores indicated that individuals disclosed a

greater level of information on their online profiles. Profile data provides a means of assessing an individual's typical information disclosure habits on Facebook. It was therefore used in the analyses to operationalise online connective behaviour (RQs 2 & 3) in terms of a form of self-disclosure in Chapters 4 and 5.

*Social Diversity:* Sixteen types of social connection (see Chapter 7: Table 7.2, p.250) were presented as dichotomous (*Yes/No*) items. The items were reflective of the common network cluster categories previously attributed to ego-centric social network structures (Binder et al., 2012; McCarty et al., 2001). An overall tally of the number of different social connection types was produced by summing up the number of positive responses to these items. Scores could therefore range from 0 to 16, with higher scores indicating increased heterogeneity of connections in the social network. Social diversity was used to operationalise the social diversity of an individual's social capital (see Chapter 1, p. 33, for a discussion on social capital) on an online network, brought about by engaging in the connective behaviour of online friending. Social diversity was used as a means of testing RQ4 in Chapters 7 and 8.

*Self-Disclosure:* A 12-item scale, adapted from the 10-item Self-Disclosure Index (SDI; Miller, Berg, & Archer, 1983) assessed self-disclosure. The scale indicates willingness to make emotional self-disclosures (e.g. "*My deepest feelings*") on Facebook. Two additional items were added to the scale to represent liking and anger ("*What I like and dislike about others*" and "*Things that anger me*"); both forms of emotional disclosure commonly witnessed on SNS platforms (Trepte & Reinecke, 2013). The addition of these items was deemed necessary to align the scale more closely with known and theorised Facebook behaviour. Self-disclosure was used to further operationalise online connective behaviours. All items presented to the participants, along with their factor loadings are presented in Table 3.5.

Table 3.5: CFA derived item loadings for the Self-Disclosure scale (N= 489; Male = 247, Female = 242)

Item	CFA		
	B [95% BCI]	$\beta$	SE
1. My day to day life	1.00 [1.00, 1.00]	.61***	.05
7. What is important to me in life	1.44 [1.27, 1.67]	.81***	.10
8. What makes me the person I am	1.51 [1.33, 1.75]	.86***	.11
10. Things I have done which I am proud of	1.14 [.99, 1.33]	.64***	.09
11. My close relationships with other people	1.14 [.98, 1.32]	.65***	.09
12. Things that anger me	1.30 [1.13, 1.51]	.72***	.10
2. Things I have done which I feel guilty about	1.00 [1.00, 1.00]	.75***	.08
3. Things I wouldn't say or do in public	.97 [.83, 1.12]	.73***	.07
4. My deepest feelings	.99 [.89, 1.11]	.78***	.06
5. What I like and dislike about myself	1.18 [1.07, 1.32]	.84***	.06
6. What I like and dislike about others	1.09 [.96, 1.24]	.72***	.07
9. My worst fears	1.03 [.91, 1.15]	.72***	.06

B = unstandardized;  $\beta$  = standardised; \*\*\* $p < .001$ .

Responses were positively anchored on a 5-point scale ranging from 1 (*Not at all willing*) to 5 (*Very willing*). The scale items produced an average score ranging from 1 to 5, with higher scores indicating increased willingness to participate in online emotional disclosures. The SDI and previously adapted versions of the scale have been shown to have good internal consistency (Liu & Brown, 2014; Tian, 2013; Trepte & Reinecke, 2013) for samples involved in technology based research. A precedent for the use of the SDI with an adolescent sample had been set previously in research by

Engels, Finkenauer, and van Kooten (2006). The self-disclosure variable was used in analyses testing the role of online behaviours (RQ2). Factor loadings based on CFA derived scales were used for SEM analysis of RQ 1 and 2 in Chapter 4. Full details of the CFA analysis for this scale can be found in Appendix 7. A two-factor measure of disclosure was utilised. All items loaded strongly ( $>.06$ ; Hair et al., 1998; Field, 2005) onto their respective factors. Cronbach's alpha scale reliability was good for both factors: common disclosures ( $\alpha = .87$ ) and intimate disclosures ( $\alpha = .88$ ). No items were removed from the scale during CFA analysis. Chapter 5 used a self-disclosure scale total constructed from the average score of the CFA derived items.

*Fear of Missing Out (FOMO)*: FOMO, used to operationalise an individual's level of social anxiety, was measured using the 10-item Fear of Missing Out scale (Przybylski et al., 2013). Questions were designed to assess a participant's thoughts and feelings regarding their social experiences in the week prior to the survey. All items presented to the participants, along with their factor loadings are presented in Table 3.6.

Table 3.6: CFA derived item loadings for the FOMO scale ( $N = 489$ ; Male = 247, Female = 242)

Item	B [95% BCI]	$\beta$	SE
1. I fear others have more rewarding experiences than me	1.00 [1.00, 1.00]	.60***	.04
2. I fear my friends have more rewarding experiences than me	1.07 [.98, 1.16]	.65***	.04
3. I get worried when I find out my friends are having fun without me	1.38 [1.23, 1.57]	.79***	.08
4. I get anxious when I don't know what my friends are up to	1.03 [.88, 1.21]	.72***	.08
5. It is important that I understand my friends in jokes	1.22 [1.05, 1.45]	.69***	.09
6. Sometimes, I wonder if I spend too much time keeping up with what is going on	1.01 [.84, 1.19]	.60***	.08
7. It bothers me when I miss an opportunity to meet up with friends	1.16 [.97, 1.39]	.63***	.10
8. When I have a good time it is important for me to share the details online (e.g., updating status)	.98 [.81, 1.20]	.57***	.09
9. When I miss out on a planned get together it bothers me	1.28 [1.09, 1.52]	.70***	.10
10. When I go on vacation, I continue to keep tabs on what my friends are doing	1.02 [.82, 1.24]	.60***	.10

B = unstandardized;  $\beta$  = standardised; \*\*\* $p < .001$

Responses were positively anchored on a 5-point scale ranging from 1 (*Not at all true of me*) to 5 (*Extremely true of me*). The scale produced an average score ranging from 1 to 5, with higher scores indicating higher levels of FOMO. The FOMO scale was originally developed for use with adult samples for which it has demonstrated good



internal consistency (Przybylski et al., 2013). The scale was selected for inclusion in this study, as at present it is the only validated scale that has been developed to specifically measure the FOMO phenomenon. The FOMO measure provided a means of testing the impact of extrinsic motivations (such as social anxiety) on the relationship between psycho-social vulnerabilities, online behaviours and negative online experiences, and in so doing test RQs 1, 2, and 3 of the present thesis. Analyses using the variable are evidenced in Chapters 4, 5, and 9. Full details of the CFA analysis for this scale can be found in Appendix 7. Factor loadings based on the CFA derived scales were used for SEM analysis of RQ 1 and 2 in Chapter 4. All items loaded significantly, with 7 out of the 10 demonstrating strong coefficients ( $>.60$ ; Hair et al., 1998; Field, 2005). No items were removed from the scale during CFA analysis. Scale reliability tests indicated good internal consistency for the construct ( $\alpha = .88$ ). Chapters 5 and 9 used a FOMO scale total constructed from the average score of the CFA derived items.

*Self-Esteem:* Self-esteem was measured using the 10-item Rosenberg Self-Esteem (RSE) scale (Rosenberg, 1965). The RSE provided a measure of an individual's perceived global self-esteem. The RSE contains an equal number of positively (e.g., "*On the whole, I am satisfied with myself*") and negatively (e.g., "*At times I think I am no good at all*") worded items. Responses were given on a 4-point scale ranging from 1 (*Strongly disagree*) to 4 (*Strongly agree*). Negative items (2, 5, 6, 8, and 9) were recoded so that high scores indicated higher self-esteem. All items presented to the participants, along with their factor loadings are presented in Table 3.7.

*Table 3.7: EFA and CFA derived item loadings for the two-dimensional Self-Esteem scale (N = 489; Male = 247, Female = 242)*

Item	B [BCI]	Standardised $\beta$	SE
<i>Factor 1 – Positive Self-Esteem</i>			
1. On the whole, I am satisfied with myself	1.00 [1.00, 1.00]	.79***	.07
3. I feel that I have a number of good qualities	.94 [.83, 1.06]	.83***	.06
4. I am able to do things as well as most other people	.83 [.69, .97]	.71***	.07
7. I feel that I'm a person of worth	.96 [.85, 1.07]	.77***	.06
10. I take a positive attitude toward myself	1.03 [.92, 1.16]	.78***	.06
<i>Factor 2 – Negative Self-Esteem</i>			
2. At times I think I am no good at all	1.00 [1.00, 1.00]	.80***	.08
5. I feel I do not have much to be proud of	.78 [.68, .87]	.71***	.05
6. I certainly feel useless at times	1.03 [.95, 1.12]	.85***	.05
8. I wish I could have more respect for myself	.82 [.72, .91]	.69***	.05
9. All in all, I am inclined to think that I am a failure	.97 [.87, 1.07]	.85***	.05

B = unstandardized;  $\beta$  = standardised; \*\*\* $p < .001$

The scale items produced an average score ranging from 1 to 4, with higher scores indicating higher levels of self-esteem. The RSE was originally developed for use with adult samples for which it has demonstrated good internal consistency and construct validity (Robins, Hendin, & Trzesniewski, 2001). Precedent for use of this scale with an adolescent sample had previously been set in research by Bagley and Mallick (2001). Self-esteem was used to represent an offline psycho-social characteristic and

as such allowed for the testing of RQs 3 and 5. Analyses using the self-esteem variable are evidenced in Chapters 4, 5, and 9. Parcelled factor loadings based on the CFA derived scales (see Appendix 8) were used for SEM analysis of RQ 1 and 2 in Chapter 4. A two-factor model of self-esteem was utilised. All items in the two-factor model loaded strongly ( $>.06$ ; Hair et al., 1998; Field, 2005) onto their respective factors. Cronbach's alpha scale reliability was good for both factors: positive self-esteem ( $\alpha = .88$ ) and negative self-esteem ( $\alpha = .88$ ). No items were removed from the scale during CFA analysis. Chapters 5 and 9 used a self-esteem scale total constructed from the average score of the CFA derived items.

*Personal Perception of Vulnerability (PPV)*: To determine whether people actually perceived themselves to be at risk online, and in so doing provide an indication of potential optimistic bias (as previously described on p.83), personal perceptions of vulnerability to negative online experiences on Facebook were measured by ten items drawing on the themes of privacy, future employment, and personal relationships previously outlined in research by Paradise and Sullivan (2012). Participants were asked to indicate the extent to which they felt that the information they shared on Facebook might make them subject to a range of potential negative online experiences. All items presented to the participants, along with their factor loadings are presented in Table 3.8.

Table 3.8: CFA derived item loadings for the PPV scale (N = 489; Male = 247, Female = 242)

Item	B [95% BCI]	Standardised $\beta$	SE
1. Be misused by others	1.00 [1.00, 1.00]	.83***	.05
2. Be misused against me	Removed during CFA		
3. Cause conflicts with my family	1.08 [1.01, 1.16]	.84***	.04
4. Cause conflicts with my friends	Removed during CFA		
5. Cause me problems if future employers ever saw it	Removed during CFA		
6. Attract unwanted attention from strangers	1.16 [1.09, 1.25]	.88***	.04
7. Be judged unfairly by others	1.06 [.99, 1.14]	.88***	.04
8. Make you regretful in the future	1.15 [1.04, 1.20]	.88***	.04
9. Get me into trouble with the law	Removed during CFA		
10. Be seen by people you do not know	.939 [.86, 1.02]	.76***	.04

B = unstandardized;  $\beta$  = standardised; \*\*\*p<.001

Responses to each item ranged from 1 (*No concern*) to 5 (*Strong concern*). The scale items produced an average score ranging from 1 to 5, with higher scores indicating higher levels of personal perceptions of online vulnerability. A scale total for PPV was constructed by using the average score based on the CFA derived PPV scale (see CFA analysis in Appendix 7). Items 2, 4, 5 and 9 were removed from the scale during CFA analysis. All remaining items loaded strongly onto the latent factor (>.06; Hair et al., 1998; Field, 2005). Scale reliability tests indicated good internal consistency for the 6-item scale ( $\alpha = .94$ ). Personal perceptions of vulnerability were used in this thesis to test for possible TPE's when compared to the third-person perception scales described

below. In doing so, the PPV allowed for testing of the perceptions of particular characteristics of survey respondents (RQ5: H5.2 and H5.3).

*Third-person Perception of Vulnerability (TPV):* The TPV scale was adapted from the PPV scale to measure potential third person perceptions of vulnerability. A short vignette describing a ‘typical’ teenage Facebook user was included prior to the ten items:

*“Alex is 14 and has been a regular user of Facebook for the past 6 months. Alex usually uses a smartphone to access Facebook, but also has access to the family laptop after school and at weekends.”*

Participants were asked to imagine that Alex was a teenager that they knew in real life and indicate the extent to which they felt that the information Alex shared on Facebook might make him/her subject to a range of potential negative online experiences. All items presented to the participants, along with their factor loadings are presented in Table 3.9.

Table 3.9: CFA derived item loadings for the TPV scale ( $N = 489$ ; Male = 247, Female = 242)

Item	B [95% BCI]	Standardised $\beta$	SE
1. Be misused by others	1.00 [1.00, 1.00]	.77***	.04
2. Be used against Alex	Removed during CFA		
3. Cause conflicts with my family	1.07 [.97, 1.17]	.79***	.05
4. Cause conflicts with Alex's friends	Removed during CFA		
5. Cause Alex problems if future employers ever saw it	Removed during CFA		
6. Attract unwanted attention from strangers	1.25 [1.16, 1.36]	.89***	.05
7. Be judged unfairly by others	1.11 [1.02, 1.21]	.87***	.05
8. Make you regretful in the future	1.11 [1.02, 1.22]	.86***	.05
9. Get Alex into trouble with the law	Removed during CFA		
10. Be seen by people you do not know	1.06 [.97, 1.16]	.79***	.05

B = unstandardized;  $\beta$  = standardised; \*\*\* $p < .001$

Responses to each item ranged from 1 (*No concern*) to 5 (*Strong concern*). The scale items produced an average score ranging from 1 to 5, with higher scores indicating higher levels of third-person perceptions of online vulnerability. A scale total for TPV was constructed by using the average score based on the CFA derived TPV scale (see Appendix 7 for CFA details). Items 2, 4, 5, and 9 were removed from the scale during CFA analysis. All remaining items loaded strongly onto the latent factor ( $>.06$ ; Hair et al., 1998; Field, 2005). Scale reliability tests for indicated good internal consistency for the 6-item scale ( $\alpha = .93$ ).

The short scenario presented in the vignette was purposefully vague to allow respondents to the survey to exhibit their perceptual impulses towards the targeted adolescent age group. The researcher did not wish to sway the opinion of the respondent by providing a gender specific name or a breakdown of the risky activities that 'Alex' might or might not encounter online. The TPE, for which this vignette was used to explore, indicates that individuals will often form judgements based on demographic distance (e.g., age), and/or are often fuelled by perceptions that they have gained from the mass media (Davison, 1983). Media panic surrounding facets of life, such as social networking, often attribute negative instances to all young people and not the few (Thurlow, 2006; Tufekci, 2008). Therefore, the brevity of the vignette was intended to play to respondents' 'gut instincts' and generalisations regarding adolescent vulnerability. By presenting the same brief vignette to all respondents, the perceptions of individuals both demographically close and distant could be compared, and therefore add to the investigation of whether specific user characteristics (in this case the ages of 'Alex' and the survey respondent) might play a role in perceptions of vulnerability to online negative experiences (RQ5).

This thesis does indeed acknowledge, however, that the vignette used in the online survey is not without issue. Lack of piloting raises important issues of internal validity (Hughes & Huby, 2012) and the brevity of the information provided may have led to a variance in participant interpretation (e.g., different interpretations of Alex's gender and/or Facebook usage) which this thesis is not able to capture. Furthermore, the single age group presented does not allow for additional comparisons between different aged users. Such issues are further discussed in Chapter 6, Section 6.6. The vignette, therefore, provides a useful indication of potential TPE effects, but one that could and should be developed further in the future.

### 3.6.1.3 Overview of the online survey samples

Utilising the sampling procedure previously described in Section 3.4 (p. 108), data were collected using the online survey to produce cross-sectional and longitudinal datasets. The descriptive statistics for each sample at T1, T2, and T3 are displayed in Table 3.10.

*Table 3.10: Descriptive statistics for participants at each survey time point*

	T1 Mean (SD)	T2 Mean (SD)	T3 Mean (SD)
Age	20.88 (10.12)	20.51 (9.98)	20.45 (9.81)
SNS Use	2.54 (1.48)	2.53 (1.47)	2.36 (1.41)
Network Size	424.28 (419.46)	415.21 (495.17)	354.94 (302.26)
Profile Data	8.48 (3.46)	8.46 (3.29)	8.21 (3.90)
FOMO	1.99 (.78)	1.92 (.74)	1.91 (.85)
Disclosure	2.00 (.79)	2.03 (.78)	1.96 (.81)
Negative Online Experiences	2.52 (1.09)	2.40 (1.03)	2.26 (1.01)
Self-esteem	2.95 (.56)	2.99 (.60)	2.72 (.33)
PPV	2.42 (1.28)	2.43 (1.24)	2.53 (1.34)
TPV	2.95 (1.15)	2.95 (1.14)	3.08 (1.17)

T1 N = 489 (Adolescents (Ado) = 267; University (U) = 97; Adults (A) = 125); T2 N = 175 (Ado = 94; U = 37; A = 44); T3 N = 97 (Ado = 43; U = 23; A = 31)

### 3.6.1.3. Sample Overview

#### 3.6.1.3.1 Cross-sectional online survey sample (Time point 1)

A cross-sectional dataset containing the responses of 506 UK based Facebook users, aged between 13 and 77 years old (Mean Age = 20 years 7 months; SD = 9 years 10 months; 53% male), responded to the online survey at time point 1. Seventeen participants were removed from the analysis due to missing data, producing a final sample size of 489 (see Section 3.6.1.3.1.1, p.137). The 489 participants (51% male) had a mean age of 20 years 11 months (SD = 10 years). The final dataset was used in



the analyses presented in Chapter 4 of the present thesis to test RQs 1 & 2. Table 3.11 provides a demographic overview of the characteristics of the sample.

*Table 3.11: Sample characteristics for the cross-sectional survey (N = 489)*

	Frequency (%)
<b><i>Panel</i></b>	
Adolescent (13 – 17 years)	267 (55%)
University (18 – 21 years)	97 (20%)
Online Adult (22+ years)	125 (26%)
<b><i>Gender</i></b>	
Male	247 (50.50%)
Female	242 (49.50%)
<b><i>Facebook Privacy</i></b>	
Don't Know	28 (5.70%)
Anyone	69 (14.10%)
Friends Only	289 (59.10%)
Friends + Additional Filters	87 (17.80%)
<b><i>Facebook Primary SNS</i></b>	
Yes	322 (66.00%)
<b><i>Facebook Access Device</i></b>	
Smartphone	308 (63.00%)
PC	111 (22.70%)
Tablet	70 (14.30%)
<b><i>Motivation for Facebook Use</i></b>	
Contact with past contacts	412 (84.00%)
Contact with current contacts	429 (87.70%)
To see what others are up to	278 (56.80%)
Looking people up	202 (41.30%)
To share information	145 (29.70%)
Peer pressure	195 (39.90%)

The mean duration of reported Facebook membership was 4 years 8 months ( $SD = 2$  years 0 months). Facebook was the primary SNS used by 66% ( $n = 322$ ) of the sample. Almost two thirds (60%) of the sample reported having their Facebook profiles set to friends only, with a further 18% reporting having additional filters in place to increase the security of their information. Smartphones were the most popular internet enabled access device, being used to access the site by 63% of participants. Use of such constantly connected devices was reflected in the log-out procedures of 68% of the sample who stated that they rarely logged out of the site, preferring instead to leave the application running in the background of their devices.

In terms of the sample's motivation for engaging with Facebook, maintenance of existing friendships was the most popular reason for engaging with Facebook, with 84% of the sample reporting using the site to keep in contact with individuals whom they had been previously been acquainted with and 88% using the site to communicate with current friends. Social surveillance was also a popular reason for using Facebook with 57% reporting using the site to keep up to date with the lives of people in their social spheres. Forty-one percent also reported using the site to actively find out information about people they had met socially. Only one-third of the sample reported using Facebook to share information about themselves (30%). Peer pressure to use the site was reported by 40% of the sample.

#### *3.6.1.3.1.1 Handling missing data for the cross-sectional dataset*

The way in which one handles missing data is dependent on whether they are classified as MCAR (missing completely at random), MAR (missing at random), or MNAR (missing not at random). To determine the type of missing data in this dataset Little's

MCAR test (1988) was performed and proved significant at both the individual survey item level,  $\chi^2(4067) = 4516.22, p < .001$ , and when using scale totals,  $\chi^2(148) = 261.33, p < .001$ , suggesting that the data in this sample were not MCAR. Patterns of data missingness were investigated with t-tests. Significant t-tests were evident for a number of main study variables: network size, self-esteem, FOMO, PPV, and TPV. The missingness was therefore consistent with data being missing at random (MAR; Garson, 2015).

Missing data that are deemed MAR can be approached using a variety of methods. Traditional approaches including listwise deletion, pairwise deletion, and mean substitution have been subject to criticism as they can lead to underestimated and biased statistical inferences (Fichman & Cummings, 2003; Pigott, 2001). Maximum likelihood (ML) estimation is a preferred method as it can base model estimation on the observed data available without compromising sample size (Pigott, 2001).

AMOS, the main analysis tool used for the variables (Chapters 4 and 5), provides automatic ML estimation for SEM based models (Byrne, 2010); however, it is at the cost of bootstrapping capabilities. AMOS will not produce bootstrapped estimates if any missing data are detectable. As the analyses discussed in these chapters require bootstrapped confidence intervals for establishing indirect effects and mediation, ML estimation was not deemed appropriate as it would require the exclusion of all participants with missing data. The Expectation-Maximum (EM) algorithm was therefore used in SPSS. The EM algorithm uses ML algorithms to impute the missing data in the dataset (Hill, 1997). Statistical literature supports the use of EM as a means of handling missing data, with its performance being comparative with other statistical methods such as multiple imputation (Schafer & Graham, 2002). In line with

recommendations made by Wu, Jia, and Enders (2015), EM estimates were not rounded to prevent unnecessary bias.

Missing values analysis (MVA) in SPSS revealed that out of the 506 total Phase 1 responses, 43 participants had at least one missing variable. On inspection of the dataset, 17 participants demonstrated substantial missing data (>20%) and so were automatically removed from the dataset. For the remaining sample ( $N = 489$ ), missing data ranged from 0 to 4.5% per variable ( $M = .06$ ).

#### *3.6.1.3.2 Longitudinal online survey sample (Time point 2)*

One hundred and seventy-five of the original sample of UK based Facebook users, aged between 13 and 77 years old (Mean Age = 20 years 6 months; SD = 10 years 0 months; 48% male), responded to two waves of the online survey. Of these, 94 (54%) were school-based adolescents, 37 (21%) were university-based students and 44 (25%) were online adults. This represented approximately 35% of the overall sample. The two-wave longitudinal dataset was used to test RQ3 in Chapter 5. Attrition analysis with t-tests was used to compare the main study variables between the T2 sample and participants who completed T1.

##### *3.6.1.3.2.1 Attrition at T2*

In longitudinal studies, sample attrition can be a source of bias if the characteristics of those who have left the study differ significantly from those who remain (Thomas et al., 2012). An analysis of participant characteristics was undertaken to determine the extent to which this attrition might have biased the sample characteristics in the present research. Overall T2 of the longitudinal survey attracted 373 online responses: 284

school-based adolescents, 38 emerging adults, and 44 adults. Of these responses, 255 were validly matched to survey responses from Wave 1. Unmatched and duplicate responses accounted for 118 wave 2 survey responses (>99% school based) being discounted. For unmatched participants, user names had been provided that did not follow the naming conventions used in Wave 1. Demographic similarities in the school samples, rendered attempts to match responses using alternative data points largely unsuccessful. Only one participant from the non-school based panels was lost due to problems with data matching. Duplication of user names was also an issue, with some school-based participants submitting multiple responses. In such instances, the participant's first attempt was retained and all others removed from the dataset

A large proportion (53%) of the survey attrition at T2 was from school-based participants. This was not unexpected as two schools (state-funded secondary schools) dropped out of the study at T2, due to staffing changes during the academic year, rendering a loss of approximately 45 students. For the three remaining schools, the true level of attrition is difficult to estimate due to the issues regarding data matching. It is quite possible that of the 'missing' school-based participants, a reasonable number may have completed T2, but using different user names.

The non-school based panels accounted for approximately 47% of the T2 survey attrition with both adults and university students suffering attrition rates of over 50% per panel. For the adults, the majority of the 'missing' participants can be accounted for by the 45 participants who indicated at the end of the first survey that they were unwilling to take any further part in the study. For the university based emerging adult panel, it is likely that attrition levels were high due to many students having already reached their quota of university research participation credits. Despite the offer of a further incentive (i.e., the prize draw; see Section 3.5.1.1, p. 116), for some university-

based students, participation in research studies is merely a means to accrue the required credits to facilitate their own future research endeavours, therefore, ensuring their continued participation is somewhat of a challenge.

Despite the reduction in sample numbers at T2, a t-test comparison of the main study variables at T1 and T2 indicated that there were no significant differences ( $p > .05$ ) in the main study variables.

#### *3.6.1.3.2.2 Missing data at T2*

Missing values analysis (MVA) in SPSS revealed that out of the 255 matched responses, 96 participants had at least one missing variable. On inspection of the dataset, 80 participants demonstrated substantial missing data ( $>20\%$ ), and so were automatically removed from the dataset. The majority (86%) of those removed were school-based participants with in excess of 50% missing data across the two waves. It should be noted that in many cases these participants had provided barely more than basic demographic details (username, age, gender) before moving to the end of the survey and entering the prize draw.

For the remaining sample ( $N = 175$ ), missing data ranged from 0 to 3.4% per variable ( $M = .30$ ). Little's MCAR test (1988) was performed for each main study variable/scale. All tests were non-significant ( $p > .05$ ) indicating that data from both waves were missing completely at random (MCAR). EM estimation was used to impute missing data values.

#### *3.6.1.3.3 Longitudinal online survey sample (Time point 3)*

A total of 97 participants (Mean Age = 21 years 4 months (SD = 10 years 4 months), 56% female) completed the survey at all three time-points. Of these, 43 were adolescents, 23 were university-based students, and 31 were online adults. Seven participants were removed from the analysis due to missing data (> 20%). The three-wave longitudinal dataset was used to test RQ4 in Chapter 6.

##### *3.6.1.3.3.1 Attrition at T3*

Further attrition was experienced between T2 and T3 with the loss of 78 participants. At least 20 of the participants lost between these phases could be attributed to a third school (the only remaining state-school funded secondary) pulling out of the research, once again due to staff changes experienced at the school during the academic year. Problems with data matching were once again evident amongst the remaining participants. A comparison of the main study variables for the samples at all three phases showed that significant differences in Negative Online Experiences ( $t(584) = 2.17, p = .030$ ) and Self-Esteem ( $t(584) = 9.47, p < .001$ ) were evident between T1 and T3, with participants completing all three phases of the research displaying lower levels of reported exposure to negative online experiences (T1 Mean = 2.52 (SD = 1.09); T3 Mean = 2.26 (SD = 1.01)) and self-esteem (T1 Mean = 2.95 (SD = .56); T3 Mean = 2.72 (SD = .33)). Between T2 and T3 a significant difference ( $t(270) = 4.09, p < .001$ ) was also found in the Self-Esteem scores, with levels at T2 (Mean = 2.99; SD = .60) being higher than at T3. No other significant differences were evident for any of the main study variables between the three time-points.

#### *3.6.1.3.3.2 Missing data at T3*

At T3 (N = 97) inspection of the data revealed that 7 participants had substantial missing data (>20%) and so were removed. For the remaining sample (N = 90) there were no further missing data apparent for any of the main study variables.

#### *3.6.1.4 Survey data analysis methods*

To maximise the potential of the survey-based datasets, a number of data analysis methods are employed throughout the thesis. Standard statistical methods are combined with more complex approaches to data analysis including structural equation modelling (SEM), and multiple mediation analysis. An overview of the modes of analysis and the software used follows.

##### *3.6.1.4.1 Standard statistical methods*

A range of standard statistical methods including descriptive statistics, bivariate correlations, t-tests, and MANCOVA (multivariate analysis of covariance) were conducted during the analysis of the datasets presented in this thesis. When testing RQ5 (H5.2 & H5.3), appropriate sample sizes for t-tests and MANCOVAs were ensured using a power threshold of .80 (Fritz & Mackinnon, 2007) and were calculated using G\*Power V3.1.9.2 (Faul, Erdfelder, Lang, & Buchner, 2007). All standard tests were conducted using SPSS V.21 (Arbuckle, 2012). In addition, a range of other tests were used to address specific research questions presented in the thesis. These are detailed below.



#### *3.6.1.4.2 Structural equation modelling (SEM)*

SEM is a statistical modelling technique that provides a means of testing causal processes using a combination of observed and latent variables (Byrne, 2010; Hox & Bechger, 1998). SEM uses a confirmatory approach that lends itself to inferential data analysis and hypothesis testing, surpassing the predominantly descriptive nature of more traditional forms of multivariate analysis (Byrne, 2010).

In this thesis, SEM based analyses were used to test the confirmatory factor analysis (CFA) of all self-reported scales prior to empirical analysis (see Appendix 7 for full CFAs). SEM analysis was also used for causal modelling using latent constructs (all hypotheses relating to RQ1 & RQ2), and longitudinal path analysis (all hypotheses relating to RQ3), testing the relationships between self-esteem, FOMO, online behaviours and negative online experiences in Chapters 4 and 5. SEM analyses were conducted using AMOS v.21 (Arbuckle, 2014).

Sample size is an important consideration in SEM based models. General guidance for models estimated using maximum likelihood (ML) is to have a sample size of upwards of 200 participants to ensure effect sizes do not become negligible (Jackson, 2001). For more complex models it has been suggested that a model parameter to participant ratio be calculated, which should be no lower than 1:5 but ideally be between 1:10 and 1:20 (Jackson, 2001; Schwab, 1980). The SEM based analyses presented in this thesis aimed to have a minimum parameter to sample ratio of at least 1:5. Resampling in the form of bootstrapping was used in all analyses to ensure reliability of estimates.

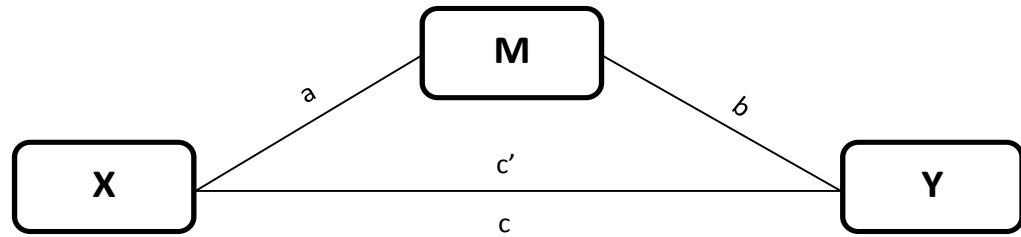
The success of a SEM analysis is based on the goodness of fit to the model data. Goodness of fit is a means of determining how well a statistical model fits into a set of observations (Maydeu-Olivares & García Forero, 2010). Model fit for SEM based

analyses in AMOS were determined by checking for consistency across a range of alternative fit indices (Hooper, Coughlin, & Mullen, 2008). Five fit indices were reported for all SEM models described in the present thesis: the Chi-Square ( $\chi^2$ ) test, the Tucker Lewis Index (TLI; 1973), the Comparative Fit Index (CFI; Bentler, 1990); the Root-Mean-Square Error of Approximation (RMSEA; Steiger, 1998); and the Standardised Root Mean Square Residual (SRMR; Jöreskog & Sörbom, 1982).

Good model fit is indicated by a non-significant  $\chi^2$  test (Bryne, 2010). The  $\chi^2$  test has a tendency to underestimate model fit in larger sample sizes (> 400; Kenny, 2014). As such for this set of analyses the TLI, CFI, RMSEA, and SRMR were considered as more reliable indicators of model fit. The alternative fit indices ranged in value from 0 to 1. Recommended cut-off values of >.95 for TLI and CFI and <.05 for RMSEA (with upper 90% CI <.08) and SRMR were used to indicate good fit (Hu & Bentler, 1999).

#### *3.6.1.4.3 Mediation analysis*

Mediation analysis (Figure 3.2) is used to test whether an explanatory variable (X) is shown to influence an outcome variable (Y) via a mediating variable (M) (Baron & Kenny, 1986; Hayes, 2009). The traditional causal steps approach to mediation analysis posits that significant effects must be evident between all three variables for mediation to be possible (Baron & Kenny, 1986).



*Figure 3.2 Example of simple mediation analysis*

Mediation is said to occur when the total indirect effect ( $c'$ ) is significantly different from 0. More recent research into mediation methods has argued that the causal steps approach is said to be short-sighted in assuming that a lack of direct effect ( $c$ ), from the explanatory variable ( $X$ ) to the outcome variable ( $Y$ ) renders mediation unattainable (Hayes 2009; MacKinnon & Fairchild 2009). Instead, it has been proposed that the mediator ( $M$ ) can create indirect causal links between the explanatory variable ( $X$ ) and the outcome variable ( $Y$ ); links which through the use of the causal steps route alone would be missed (Preacher & Hayes, 2008). The mediation analyses discussed in the present thesis therefore considers these indirect effects in order to aid the interpretation of the associations presented.

Mediation analyses were conducted to assist in the answering RQs 1 to 4 of the present thesis. Mediation hypotheses H1.2, H2.2, and H3.4 were tested using AMOS V.21. Hypotheses H4.1 to 4.3, and H5.4 to H.5.5 were tested using PROCESS (Hayes, 2015), a macro developed for use with SPSS. In Chapters 4 and 5, mediation analysis is used to provide an indication of the indirect and direct effects found, when considering the role of FOMO and online behaviours on the relationship between self-esteem and negative online experiences (RQs 1 to 3). In Chapter 7, mediation analysis is used to test the impact of social and network diversity on the relationship between SNS use and negative online experiences (RQ4), and in Chapter 8 the mediation

analysis considers the role of specific characteristics of online user (i.e., non-standard profiles) on the model presented in Chapter 7 (RQ5). The mediation analyses presented in Chapters 7 and 8 combine measures from both the online survey (T1) and digitally derived measures. In all instances, an analysis of indirect effects based on bootstrapped 95% confidence intervals (95% CI) was used to assess potential mediated effects using multiple mediators. In common with SEM analysis, mediation analysis is best served by larger sample sizes. Minimum sample size estimates for mediation analyses conducted in AMOS were based on SEM parameter-sample ratios as described in Section 3.6.2 below. All analyses conducted in PROCESS used bootstrapped resampling and therefore were less prone to the constraints of sample size bias (Preacher & Hayes, 2008).

### *3.6.2 Digitally derived data task*

The use of digitally derived Facebook data in research is bound by strict data policies. For a time, Facebook allowed individual users to access and download mutual friendship data pertinent to their personal network via the Facebook API (Application Programmer Interface)<sup>1</sup>. A number of third party applications existed that were capable of performing digital network data extraction on behalf of the user. The information provided by these applications listed the ego-users' connections and also provided an indication of the mutual connections present between those featured on the list. Such information provides an invaluable asset for researchers wishing to

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<sup>1</sup> As of April 2015, the use of applications that automatically acquire and store the personal data of its users are very much discouraged due to issues of platform and user consent (Facebook, 2015). All digital data collected for this research was completed by December 2014.

perform in-depth network analysis as it allows for networks to not only be metrically evaluated but also visualised as a network map.

In order to access mutual friendship data Facebook required user consent to ensure that data ownership policies were not breached. This presented an interesting data collection restraint in terms of the research, as it meant that a researcher alone could not access the digital data required for the analysis. Instead user interaction was required at all stages of the digital download. As the research design predominantly favoured the use of remote forms of data collection (i.e., online surveys) this meant that any third-party application used to retrieve digital data needed to be user intuitive and provide a straightforward means of passing on the resultant data to the researcher.

To ensure that the digital data collection method used for this research complied with Facebook data policies (pre-April 2015), facilitated ethical data practices (BPS, 2009; BPS, 2012), and provided an intuitive user experience, thorough testing of potential third party solutions (NodeXL, Wolfram, Netvizz, and GiveMeMyData) was undertaken. An overview of the findings of this testing can be found in Appendix 6.

From the four applications tested, Netvizz (Rieder, 2013) was selected for the final digital data collection. Netvizz is a free to use application that enables individual Facebook users to access their mutual friendship data generated by the Facebook API. Network data obtained in this way include a unique identifier for each Facebook contact, the name of the Facebook contact, and their gender. Further, all available interconnections among the ego's contacts, at the time of data collection, are listed. The data generated by Netvizz, provides the basic Facebook API information needed for a researcher to conduct SNA (Rieder, 2013) on the dataset, and in so doing provides digitally derived opportunities to address RQ4 and RQ5. For instance, the list of

friends can be summed to generate an overall measure of network size (RQ4), the names of friends analysed to identify potential anomalies (RQ5), and the interconnections extrapolated to provide measures of network centrality and clustering that can be used to consider network diversity (RQ4) and popularity (RQ5).

Unlike the other applications tested, Netvizz provides data in a text based format that is readily transferable to a range of different social network analysis tools. The data contained in the text file are also limited to information that is pertinent to friendship network analysis (i.e., it does not contain pictures or other forms of personal disclosure). While details of self-disclosures and communicative interactions between users can be obtained by other network data applications (e.g., Wolfram), the capture of such highly nonymous and personal data from an SNS-users online 'friends' provided an ethical and moral dilemma. On the one hand such data would have allowed for an in-depth exploration of self-disclosure, akin to the attention paid to online friending in this thesis. However, the facility to capture data only intended to be viewed by an individual's closed network raises issues regarding consent. As quoted in the BPS Ethical Guidelines for Internet Mediated Research, observation of behaviour should only take place if an individual "*would expect to be observed by strangers*" (BPS, 2013, p.6). In the case of automated download of digital disclosures, such data were not deemed to be merely 'observation' and therefore the collection of a digital file of such interactions was deemed to be beyond the ethical scope of this research. For this reason, this thesis uses network data only, data which as provided by Netvizz are in the semi-public domain (i.e., readily accessible to the network holder to pass to the researcher) and can be easily anonymised. Finally, a major advantage of Netvizz over the other applications tested was that it provided an intuitive user interface that could be readily linked to a remote online survey with minimal

instruction. In contrast, the other applications tested required either pre-requisite IT knowledge (GiveMeMyData and NodeXL), local access (NodeXL), or in the case of Wolfram a payment for the data.

It should be noted that Facebook users who have set high privacy permissions, to the extent that connections have blocked or hidden certain elements of their profile (e.g., gender, friends list) from the SNS user, are not readily captured by the Netvizz application (Rieder, 2013). Research has suggested that while approximately 53% of Facebook users hide their friends lists from open public view (Dey, Jelveh, & Ross, 2012), rates of selectively blocking or hiding such information from a mutual friend is considerably lower (approximately 13 – 17%; Johnson, Egelman, & Bellovin, 2012, Vitak, 2012). This lends support to research by Lewis, Kaufman, Gonzalez, Wimmer, and Christakis (2008) and Moreno et al. (2009) who estimate that around 80% of Facebook users do not alter their privacy settings.

In the context of this research, network connections selectively blocking content from the ego had the potential to render some SNS user friend lists captured by Netvizz incomplete. While, the risk of missing data is a concern in network-based studies, the benefits of drawing on digitally downloaded lists direct from the Facebook API still far outweighs the potential memory limits of relying on self-reported lists of network contacts (Stiller & Dunbar, 2007). The ability to generate an accurate digital list of online connections takes this research far beyond the realms of merely ‘asking’ a user to recall their friends, a method which is reliant on a user’s memory and knowledge of the network. As such while a small number of networks might be incomplete, the opportunity to generate a largely accurate digital account of not only who an SNS-user is connected to, but also how their ‘friends’ are connected to each other provides

researchers with the opportunity to explore data that would not be easily attainable from self-report alone.

#### *3.6.2.1 Digitally derived network measures*

To supplement the survey measures (i.e., age, gender, social diversity, and the outcome variable, negative online experiences) previously outlined in Section 3.6.1.2 (p.120), digital network characteristics were derived from data generated by Netvizz (Rieder, 2013). Network metrics were calculated using NodeXL, a social network analysis (SNA) tool developed by the Social Network Research Group (Hansen, Shneiderman, & Smith, 2011). NodeXL builds on the features of the standard Microsoft Excel package to provide a cost-efficient and intuitive means of both conducting SNA and graphically visualising large digitally derived datasets. SNA is a methodological approach to the study of social relationships. With its roots in mathematical graph theories, SNA has grown in prominence in the realms of the social sciences providing a means of visually mapping and quantifying connections within the social world. SNA was used to calculate metrics for the digitally derived data presented in Chapters 7, 8, and 9. In doing so, research questions requiring metrics such as network size (RQ4 & 5), network clustering (RQ4), and user centrality (RQ5) were satisfied.

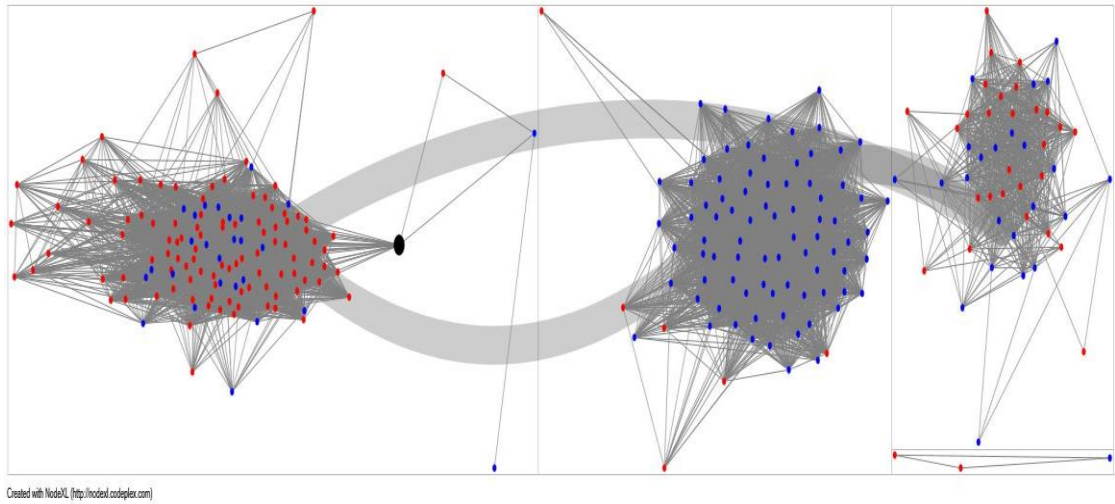
*Network Size:* An estimate of digitally derived network size was gained by summing the total number of network contacts listed in the Netvizz data. Network sizes for the digitally derived sample ( $N = 177$ ) ranged from 4 to 1468. The digitally derived network size measure provided a more accurate reflection of an individual's online friending behaviours, than the self-reported measure previously described in the online



survey (Section 3.6.1.2, p.120). Only available from modest sub-samples of participants, the digital measure was used to test RQ4 and RQ5, outlined in Chapters 7, 8, and 9.

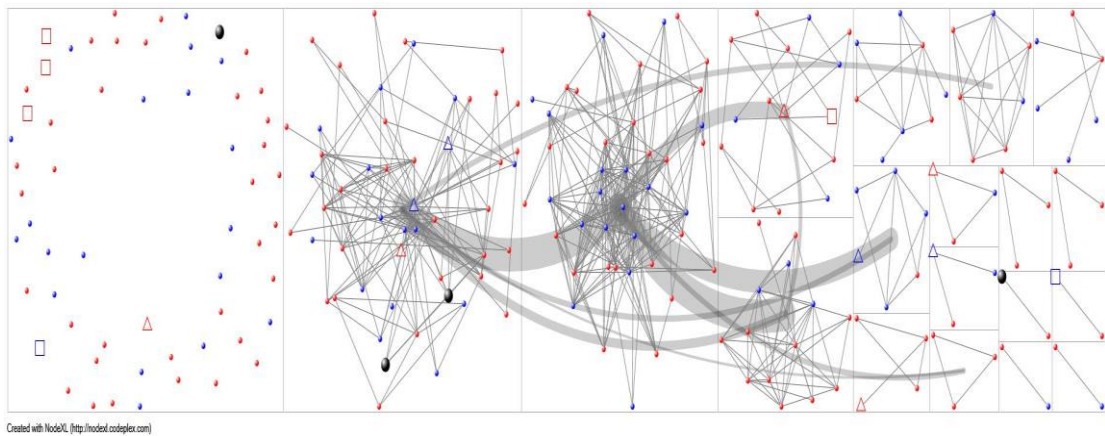
*Network Clustering:* Clustering was calculated using the Clauset, Newman, and Moore (2004) algorithm. The Clauset-Newman-Moore clustering algorithm is a built-in feature of the NodeXL software. It utilises a hierarchical agglomeration algorithm that has been optimised for fast computation of network community structures (Abbasimehr & Tarokh, 2015; Clauset et al., 2004). It was selected for use in this research, over and above the alternative clustering algorithms provided by NodeXL (Wakita & Tsurumi, 2007; Newman-Girvan, 2004) due to it being more efficient, both in time and the computational demands of an average computer, when dealing with larger network datasets. Precedent for using this algorithm with Facebook networks has been set in research by Brooks, Welser, Hogan, and Titsworth (2011).

A clustering coefficient was created for each individual node within the network. A global clustering coefficient was then produced for the entire network by averaging the individual coefficients. The global clustering coefficient ranges from 0 to 1. As exemplified in Figure 3.3, coefficients approaching 1 indicate closely-knit networks with dense network structures with only a small number of social spheres present in the network.



*Figure 3.3: An example of a close-knit Facebook network with 269 'friends' and a global clustering of .747*

In contrast, coefficients closer to zero, as exemplified by Figure 3.4, are indicative of more heterogeneous network structures encapsulating multiple social spheres, isolated connections and instances of non-standard network contacts.



*Figure 3.4: An example of a highly diverse Facebook network with 235 'friends' and a global clustering of .391*

The clustering coefficients produced provided a digitally accurate overview of the network diversity of an individual user's online Facebook network. As such, it was deemed an appropriate means of testing network diversity (offering a direct

comparison to self-reported diversity outlined on in Section 3.6.1.2, p.120) for RQ4 outlined in Chapters 6 and 7.

*Non-standard profiles:* Non-standard profiles (previously discussed in Chapter 2, Section 2.3.1.1.4.2, p.75) are profiles that are not characteristic of personal profile norms and/or patterns of connectivity evident in typical Facebook networks. For the analysis outlined in Chapter 7 (RQ5: H5.5), these anomalies were measured by four variables: gender-hidden profiles, misclassified profiles, pseudonym represented profiles, and network outliers. Gender-hidden profiles were calculated using gender information for each network contact derived from the digital data. The number of network contacts with missing gender details was summed. This provided a total score of gender-hidden network contacts for each individual network. The total number of network outliers was generated using social network analysis to identify the number of network isolates in each individual network.

To calculate the number of misclassified profiles and pseudonym-represented profiles, a qualitative appraisal of the network contacts was made. All network contacts were inspected across the 177 digitally derived networks (approximately 71,000) for instances of obvious pseudonyms (e.g., Mickey Mouse) and/or misclassified entities (e.g., companies, student groups) using a study-specific set of anomaly indicators derived from an initial assessment of a small sub-scale of 10 networks (Table 3.12). This was done by one rater. A sample of 1,500 network contacts was then given to a second rater and ratings were compared. Where the raters disagreed this was resolved without difficulty indicating good general understanding of the coding criteria. Further, Cohen's  $\kappa$  showed good inter-rater agreement,  $\kappa = .73$  (95% CI, .67 to .80),  $p < .001$ . Instances of pseudonyms and misclassified entities were then summed up to provide an overall total for each network.

Table 3.12: Network Anomaly Indicators for Non-standard profiles

<i>Pseudonym Profiles</i>	Profile names represented by full or partial pseudonym. Pseudonym names will not clearly identify the user. They may be partial pseudonym (e.g., Sarah B (i.e., you are not sure what the B stands for), Sarah Peppa Pigs Friend (i.e., correct first or last name but uses a made up name for the other), or full pseudonym (e.g., Peppa Pig, Blue Eyed Girl). Pseudonym names may include fantasy sounding names or names that include characters or references to TV, Film, and Video Games. They may also sound totally unbelievable and use made up words.
<i>Misclassified Profiles</i>	Profile names associated with non-personal entities, e.g., companies, clubs, groups, pets, etc. They might feature words such as Hair, Nails, Club, Tyres, Art, PT, Tattoo, Cakes, Alumnae, place names, names of bands, university names, acronyms, etc. They may include a person's name (e.g., Sarah PT Buglass (PT = Personal Trainer), Sarah "Cakes by Design" Buglass, Sarah 'NTU REP' Buglass) or it may be the actual company/group name (e.g., "Cakes by Design").

### 3.6.2.2 Digitally derived sample

Of the initial 506 participants who responded to the online survey during Phase 1 of the research data collection, approximately 35% provided both self-report survey data and digitally derived Facebook metrics. This constituted an overall digital sub-sample of 177 UK based Facebook users (63% female). General sample characteristics for this sub-sample are displayed in Table 3.13.

Table 3.13: Digitally derived sample characteristics (N = 177)

	Frequency (%)
<b><i>Panel</i></b>	
Adolescents (13 – 17 years)	49 (28.0)
University students (18 – 21 years)	64 (36.0)
Online adults (22+ years)	64 (36.0)
<b><i>Gender</i></b>	
Male	65 (36.7)
Female	112 (63.3)
<b><i>Daily Facebook Engagement</i></b>	
0-15 minutes	51 (28.8)
16-30 minutes	45 (25.4)
31-45 minutes	29 (16.4)
46-60 minutes	22 (12.4)
1 hour +	30 (16.9)
<b><i>Facebook Privacy</i></b>	
Don't Know	9 (5.1)
Anyone	11 (6.2)
Friends Only	118 (66.7)
Friends + Additional Filters	39 (22.0)

The mean age of the sub-sample was 22 years 10 months ( $SD = 9.82$ ; Range: 13-77 years). The mean duration of Facebook membership was 5 years 5 months ( $SD = 2.04$  years). Over half of all participants (54%) reported engaging with Facebook for 30 minutes or less per day. However, the majority of participants (72%) reported high

rates of actual connectivity, indicating that whilst not actively engaging with Facebook they very rarely logged out of the network. The majority of participants (89%) reported using at least the standard “Friends Only” Facebook privacy settings, with 22% of these using more advanced additional filtering options.

#### *3.6.2.2.1 Sample attrition during the digital phase*

Sample attrition was also experienced in the digitally derived phase of the research. Dropout rates for participants were approximately 31% for university students, 49% for online adults, and 83% for school-based participants. The large number of school-based dropouts was in part down to problems accessing Facebook on some school networks. Attrition analyses comparing the participants who provided both survey and digitally derived data (at T1) with the survey only participants for the main study variables indicated systematic attrition ( $p < .001$ ) in terms of participant age (Survey Only  $M = 19.56$ ,  $SD = 9.66$ ; Digital  $M = 22.98$ ,  $SD = 10.02$ ) and the number of reported online social groups present within their networks (Survey Only  $M = 9.37$ ,  $SD = 3.25$ ; Digital  $M = 11.53$ ,  $SD = 3.59$ ). This indicated that the digital sample were older and connected to a more diverse array of social groups than the survey sample. The differences in age and network diversity could be accounted for by the loss of school-aged participants (who might be expected to have less diverse networks due to their stage in life) during the digitally derived data collection due to technical difficulties faced by the schools.

#### *3.6.3 Social network appraisals*

Digitally derived data provides extensive insight into the structural characteristics of an individual’s Facebook network. However, they cannot alone provide information

pertinent to more personal aspects of the relationship such as how the Facebook user knows the friend or how close they actually feel to them. For the final stage of the data collection a small sub-sample of participants volunteered to appraise a random sample of friends (for a maximum of 100 contacts) from their Facebook networks in terms of their relationship type, perceived closeness, perceived communication rate, and perceived instances of negative online experiences. A combination of online survey measures (as described in Section 3.6.1.2, p.120), digitally derived data (as described in Section 3.6.2.1, p. 151) and self-reported measures specific to the appraisal study (see Section 3.6.3.3 below) was used to conduct detailed appraisals of individual users' Facebook networks and to gain a more detailed insight into Facebook users' perceptions of negative online experiences. The dataset derived from the network appraisals sub-sample was used to address RQ5 in Chapter 9.

#### *3.6.3.1 Network appraisal sample*

Eligibility for the network appraisal task was based on the SNS user's prior completion of both the online social networking survey (T1) and the submission of digital network data. A sub-sample of 52 UK-based Facebook users ( $M = 21$  years 11 months,  $SD = 7$  years 8 months, 39 female, 13 male) participated in the network appraisals. Of these participants, 10 were adolescents, 24 university students, and 18 adults. Participants reported a mean duration of Facebook membership of 5 years 7 months ( $SD = 2$  years 1 month). The sample represented approximately 10% of the overall research sample who engaged in the initial round of survey data collection. While this represents a small proportion, the complex and labour-intensive data collection methods employed during the network appraisal task were conducive with only a modest overall participant sample size.

A connection-level sample of 5113 (53% female) Facebook connections were obtained from the SNS users' networks using a combination of digitally derived data and in-depth self-report surveys on a maximum of 100 connections per user. Almost all (97%) of the sampled online connections had been given full profile access to their respective SNS user network, enabling them to see and interact with all of the content available.

#### *3.6.3.1.1 Comparing the network appraisal sample to the T1 survey sample*

An analysis comparing the means from the network appraisal sample with the initial T1 survey sample was conducted. A significant difference in the means of the scores for negative online experiences ( $t(539) = 2.53, p = .012$ ) and self-esteem ( $t(539) = 9.71, p < .001$ ) were found. The mean scores for negative online experiences were significantly higher for the network appraisal study ( $M = 2.92, SD = 1.05$ ) than the initial T1 survey sample ( $M = 2.52, SD = 1.09$ ). The mean scores for self-esteem were significantly lower for the network appraisal sample ( $M = 2.17, SD = .45$ ) than the T1 survey sample ( $M = 2.95, SD = .56$ ). This indicated that there was systematic differences present between the large T1 survey sample ( $N = 489$ ) and the much more modest network appraisal sample ( $N = 52$ ). Participants in the small sample appeared to be more psychologically vulnerable and had experienced more incidents of negative online experiences. Whilst the smaller sample was somewhat biased towards the more vulnerable of the participants, it is worth noting that the mean scores were within the same measurement rating for each scale.

The systematic differences experienced between the T1 survey and the network appraisal task, was not unexpected as the sample size had reduced considerably



between the tasks. The nature of the network appraisal task rendered it attractive to individuals with a keen interest in continuing with the research. It could be that the prize draw provided incentive for this, however, in light of the analyses it would appear that individuals with an interest in online safety (possibly due to their prior experiences) may have been more likely to persevere. For this reason, the sample cannot be generalised to all UK Facebook users. It does however, offer a good opportunity to analyse the user characteristics, the networks, and the connections associated with a more vulnerable sample of SNS users (RQ5).

#### *3.6.3.2 Social network appraisal procedure*

To keep study duration and task complexity manageable, a random sample of Facebook connections ( $M = 98.44$ ,  $SD = 21.07$ ) from each digitally derived participant network was used to create participant-specific social network surveys (see Appendix 5). Each survey contained a detailed network appraisal form on which participants were asked to describe and rate their connections and respond to a series of 8 open-ended questions about their use and perceptions of Facebook (for contextual purposes). Additional network metrics (e.g., network size) pertinent to each participant-network had been obtained previously through the digital data extraction task (see Section 3.6.2, p.147).

Surveys with school and undergraduate participants were conducted in the form of structured face-to-face interviews with the researcher. To maximise response rate, online participants were permitted to complete the study using a secure online form. Common survey templates were used for all participants.

The term network disagreement was defined to participants as being indicative of “*any instances of disagreeable or unsociable behaviour directed towards self or others on the network*”. This definition was read out loud to the participants prior to their engaging in the survey. For online participants, this definition was displayed on their computer-based survey form.

### *3.6.3.3 Network appraisal measures (task specific)*

The measures used in the network appraisal study consisted of an outcome variable that was complementary to the overall research theme of negative online experiences, and predictor variables, representative of the participants and their online connections were also captured. The dataset for the network appraisals analysis was a combined dataset of variables from the T1 online survey (FOMO, self-esteem, self-disclosure; see Section 3.6.1.2, p.120), digital data extraction task (network size; see Section 3.6.2.1, p. 151) and the appraisal specific measures outlined below.

#### *3.6.3.3.1 Outcome variable*

*Perceived network disagreement:* One item assessing the perceived rate of online disagreement exhibited by each online connection (“How often does this person cause disagreement in your network with yourself or others?”). This item provided a means of operationalising negative online experiences in the context of individual network incidents involving specific online connections. Responses were positively anchored and ranged from 1 (*Never*) to 5 (*Very Often*). Overall, a low rate of reported alter disagreement ( $M = 1.20$ ,  $SD = .60$ ) was found, with only 617 (12%) alters exhibiting any rate of disagreement. The purpose of the analyses was to determine characteristics of any troublesome individual, regardless of rate, therefore a recoded binary variable

(coded as 0 for no instances of disagreement; 1 for disagreement scores of 2 or more) was deemed appropriate.

#### *3.6.3.3.2 Predictor variables specific to the online connections*

The connection specific predictor variables provided a means of operationalising the user characteristics of the network connections present in the participant networks, as perceived by the participants.

*Age:* An estimation of an online connections age was provided by the SNS-users. Coded as 0 for don't know; 1 for under 16's; 2 for older adolescents (16-18 years); 3 for emerging adults (18 – 21 years); and 4 for adults (over 22 years). For the analysis age was considered as a categorical variable, allowing for comparison between the different groups. The 358 online connections (7%) of unknown age were retained in the sample as 18 were reported as perpetrators of disagreement, therefore justifying a comparison of known versus unknown age alters.

*Online connection gender:* A digitally derived indication of the Facebook friend's gender (coded as 0 for *unknown*, 1 for *male* and 2 for *female*). The number of unknown gender connections represented 1% of the sample (33 alters), all of which were not identified as perpetrators of disagreement. To provide parity between the participant and connection demographic indicators, only connections identified as male or female were used in the final analysis ( $N = 5080$ ).

*Network Privacy:* a participant-reported indication of an individual connections' profile access rights to the participant's network (coded as 0 for *filtered access* to the participant's content, 1 for full *unfiltered access* to the content).

*Participant-Connection Relationship:* Participants were asked to identify the nature of their relationship with each identified Facebook 'friend' using 25 possible relationship

types (e.g., ‘*Parent*’, ‘*Child*’, ‘*Classmate*’ – see Table 3.14 for full list of possible relationships). The categories were adapted from common relationship categories previously attributed to ego-centric social network structures (Binder et al., 2012; McCarty et al., 2001). To simplify the analysis these relationship categories were regrouped into a three-level variable ‘Relationship Type’: present significant connections (coded as 0; e.g., *parent*, *sibling*); past significant connections (coded as 1; e.g., *previous colleague*, *previous classmate*); and loose connections (coded as 2; e.g., *friend of friend*, *casual acquaintance*). The definition of these levels was informed by previous distinctions of the types of social capital found on Facebook (Ellison et al., 2007).

*Table 3.14: Frequency data for participant-connection relationship types*

	OC Frequency (% Total N)	Disagreeable OC (% Total OC Frequency)
<b>Present Significant Connection</b>	1745 (34.0)	212 (12.1)
Parent	20 (<1.0)	2 (10.0)
Child	0 (0.0)	0 (0)
Spouse/Partner	4 (<.1.0)	0 (0)
Sibling	18 (<.1.0)	2 (11.1)
Grandparent	2 (<1.0)	0 (0)
Other Family	175 (3.0)	22 (12.6)
Best Friend	90 (2.0)	18 (20.0)
Friend	788 (15.0)	88 (11.2)
Teacher (Present)	14 (<1.0)	1 (7.0)

Classmate (Present)	269 (5.0)	34 (12.6)
Co-worker (Present)	110 (2.0)	16 (14.5)
Neighbour	25 (<1.0)	8 (32.0)
Interest Group Member	221 (4.0)	21 (9.5)
Student	9 (<1.0)	0 (0)
<b>Past Significant Connection</b>	1769 (35)	237 (13.3%)
Teacher (Past)	6 (<1.0)	1 (16.7)
Classmate (Past)	1507 (29.0)	227 (15.1)
Co-worker (Past)	174 (3.0)	1 (<1.0)
Childhood Friend	74 (1.0)	6 (<.10)
Ex-Partner	8 (<1.0)	2 (25.0)
<b>Loose Connection</b>	1599 (31)	168 (10.5)
Friend of Friend	598 (12.0)	89 (14.9)
Casual Acquaintance	587 (11.0)	62 (10.6)
Online Only Friend	40 (1.0)	1 (<1.0)
Celebrity / Public Figure	11 (<1.0)	0 (0)
Other	148 (3.0)	6 (<1.0)
Don't Know	215 (4.0)	10 (<1.0)

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*Connections N = 5113; Participant N = 52; OC = Online Connections*

*Perceived frequency of communication, offline and online:* Two items addressed the perceived rate of offline and Facebook communication between the participant and the Facebook connection. Responses to each item were positively anchored and ranged from 1 (*Never*) to 5 (*Daily*).

*Perceived closeness:* One item measuring the perceived closeness between the SNS user and the Facebook ‘friend’. Responses to each item were positively anchored and ranged from 1 (*Not at all close*) to 5 (*Very close*).

*Facebook connection popularity.* Digitally derived from a measure of online connection degree, a measure of mutual connectivity between online connections on a participant’s network, it provides an estimate of the social popularity of an individual Facebook friend on the network. To counter the effect of differing SNS user network sizes, each online connection degree was transformed into a percentage proportion of popularity in terms of the respective participant network ( $M = 14.85$ ,  $SD = 15.54$ ).

#### *3.6.3.3.3 Participant specific predictor variables*

*Participant Demographics:* Self-reported items addressing age (in *years*); gender (coded as 0 for *male*, 1 for *female*).

Following data collection, participant age was coded into a new variable ‘Participant Age-Group’ (coded as 0 for under 16; 1 for older adolescent (16 – 18 years); 2 for emerging adult (19 – 21 years), and 3 for adult (22 years +). The categorised variable better reflected the sampling methods employed by the study and increased consistency with the connection-level information.

*Participant Network Size.* An estimate of digitally derived network size (captured during the digital data extraction task; see Section 3.6.2, p.147) was gained by summing the total number of network contacts listed in the digitally derived data. SNS user network sizes ranged from 4 to 1371 ( $M = 475.27$ ,  $SD = 353.15$ ). As with other digitally derived network datasets (Brooks et al., 2014), network size was positively skewed. To reduce the impact of this on the data analysis, network size was recoded

into three groups. Grouping was based on the median and quartiles, such that networks with less than 227 connections were categorised as “*Low Network Size*”, networks with between 227 and 633 connections were categorised as “*Medium Network Size*” and networks with more than 633 connections, “*High Network Size*”.

#### *3.6.3.3.4 Open-ended questions: Sample perceptions of Facebook*

To gain a more in-depth perspective of the participants’ motives, uses, gratifications, and perceptions of using Facebook, eight open-ended questions were presented to the appraisal participant. Questions included reasons for Facebook use, likes, dislikes and perceived risks of using Facebook, online friends/perceived audience and attitudes towards Facebook safety. A full list of the questions posed to participants can be found in Table 3.15.

##### *3.6.3.3.4.1 Content analysis of sample perceptions*

Content analysis is a common method of analysis used to obtain quantitative inferences from text-based responses to open-ended survey questions. Content analysis provides an effective means of summarising participant responses into meaningful coded groups that can then be quantified and corroborated with other forms of data collection (Stemler, 2001). In the network appraisal study, content analysis was used to gain a greater understanding of the participants’ perceptions of Facebook, with particular attention being paid to their views on troublesome online networks. The purpose of this analysis was to gain a more in-depth overview of the sample.

Preliminary analysis of the eight open-ended questions was used to develop an emergent categorical coding scheme for each question (Table 3.15). Each open-ended response from each participant was then assigned to one or more categorical units, from which overall response tallies for each question, were counted. This was done by one rater. The dataset was then given to a second rater and all 2080 categorical ratings were compared. Where raters disagreed, this was resolved without difficulty indicating good general understanding of the coding criteria. Cohen's kappa showed good inter-rater agreement,  $\kappa = .85$  (95% CI, .82 to .87),  $p < .001$ .

*Table 3.15 Coded categories derived from open ended questions (N = 52; 13 Male, 39 Female)*

<i>Question</i>	<i>Coded categorically as:</i>
1. Why do you use Facebook?	Friendship maintenance, proximity, content sharing, other
2. What do you like about Facebook?	Accessibility, connectivity, social surveillance, content, other
3. What do you dislike about Facebook?	Privacy, inappropriate content, oversharing, anti-social behaviour, other
4. What do you think are the main risks of using Facebook?	Data misuse, harassment, stranger-danger, no risk, other
5. What specific features of Facebook pose the most risk?	Content, privacy settings, other
6. When you share information on Facebook, who do you think looks at that information? (imagined audience)	Friends, friends-of-friends, public, 3 <sup>rd</sup> parties, other
7. Who do you feel are the most important people on your friends list? Why?	Friends, family, distant contacts, no-one, other
8. If you were to experience or encounter something on Facebook that made you feel upset or uncomfortable what would you do?	Delete content, unfriend, report, ignore, other



The open-ended questions were used to gain an in-depth overview of the characteristics of the sample and their experiences of online troublemakers. The purpose of this was to provide additional sample context ( $N=52$ ). The results indicated that 51 of the participants used Facebook as a means of actively maintaining relationships with people from their offline social spheres, with 23 participants citing that it facilitated keeping in contact with individuals who were not in close proximity. Close friends and family members were cited as being the most important contacts on the majority of participants' networks. Popular features of Facebook included accessibility ( $N=25$ ), connectivity ( $N=34$ ), and availability of content ( $N = 16$ ). Social surveillance was also cited, with almost a fifth ( $N=10$ ) of users stating that they particularly liked being able to observe what other people were up to online: *"Facebook essentially allows you to stalk the life of others without necessarily being a part of their life - a silent witness."* (Female, 26)

Unpopular aspects of Facebook included a perceived lack of data privacy ( $N=20$ ) and the increased capability to be exposed to inappropriate and unwanted content ( $N=18$ ). In terms of perceived risks of engaging with the platform, the common concerns raised included data misuse ( $N=34$ ), online harassment ( $N=15$ ), and stranger-danger ( $N=18$ ). The nature and volume of content posted to Facebook was cited as being the most risky feature of Facebook ( $N=33$ ). In particular, participants felt that the "About Me" section of the profiles encouraged people to provide too many personal details that might be misused by others. Interestingly, five of the participants felt that using Facebook posed them no risk, with one individual stating that risk did not apply to them as they did not *"...put sensitive or overly personal information on Facebook."* (Female, 45)

In terms of data privacy, 47 of the participants suggested that the primary audience for their profile content would be their Facebook ‘friends’: People from their social spheres whom they had chosen to connect to. Many appeared to hold this belief due to “Friends only” settings that they had implemented: *“Friends only (that's what it says on the privacy settings anyway!)”* (Male, 35). A relatively modest number of participants ( $N=17$ ) indicated that other people on the wider Facebook network (e.g. friends of friends, public, Facebook) might be able to see their profile content.

Attitudes towards troublesome behaviour on Facebook networks suggested that approximately 30 of the participants would report a person or post that they found offensive or problematic to Facebook, with only a fifth of participants ( $N=11$ ) indicating that they would block or unfriend an individual due to their behaviour on the network. Approximately 15 of participants suggested that they would ignore instances of trouble, with some suggesting that troublesome behaviour was to be an expected consequence of engaging with social media: *“People on the internet like to be antagonistic as a form of entertainment.”* (Male, 20)

#### 3.6.3.4 Network appraisal data analysis

Multilevel analysis was conducted on the connection-based network appraisals. A full overview of this analysis and the methods used is provided in Chapter 9.

### 3.7 Methods summary

Chapter 3 has provided a detailed overview of the data collection methods, measures, and analysis methods used in the empirical chapters of the present thesis. In doing so, the chapter has also provided indications of any potential sample biases due to study

attrition / self-selection (most notably in the network appraisal sample). The chapter has highlighted a potential limitation in the overall sampling procedure employed by the research. The self-selected convenience sampling approach adopted by this thesis, while common in the realms of psychological research, is not conducive with producing a truly representative sample of UK Facebook users. For this reason, the empirical chapters that follow may not be fully generalised to the UK Facebook user population. Nevertheless, the analysis presented in this thesis still provides an insightful, interesting, and important contribution to the field of online network vulnerability.

The methods and measures described in this chapter are used throughout the empirical chapters of the present thesis as follows:

- Chapter 4 presents SEM based analyses of measures derived from the cross-sectional online survey (T1) to explore the impact of offline psycho-social vulnerabilities (e.g., self-esteem and FOMO) on an individual's self-reported exposure to negative online experiences (RQ1 and RQ2).
- Chapter 5 presents SEM based longitudinal path models using data derived from two-time points (T1 & T2) of the online survey to address the potential of psycho-socially vulnerable individuals to engage in a spiral of detrimental behaviour (RQ3).
- Chapter 6 presents cross-sectional (T1) and longitudinal (T1 – T3) multivariate analyses of user characteristics and self-reported perceptions of negative online experiences derived from the online survey (RQ5).
- Chapters 7 and 8 combine data from the cross sectional online survey (T1) with digitally derived data to explore potential mediated associations between

network size, network diversity, non-norm online profiles, and self-reported negative online experiences (RQ4 & RQ5).

- Chapter 9 combines online survey data, with digitally derived data and self-reported network appraisals to explore user/network characteristics of vulnerable online users/networks using multilevel modelling (RQ1 and RQ5).

## **Chapter 4: Exploring the relationship between offline psycho-social vulnerability and negative online experiences.**

### *4.1 Chapter introduction*

Chapter 4 is the first in a series of empirical chapters presented in the thesis. The chapter provides an empirical exploration of the impact that an SNS user's offline psycho-social vulnerabilities can have on their rate of exposure to negative online experiences. Specifically, the chapter seeks to investigate the influence of FOMO (Fear of Missing Out) on SNS behaviours and experiences. The chapter begins by outlining the hypothesised model to be tested. Linking to the research questions and hypotheses previously outlined (see Chapter 3, Section 3.2, p.97), the chapter gives an overview of the theoretical context for this model (adding to the literature previously presented in Chapters 1 and 2). The main analyses are presented from the perspective of a cross-sectional SEM model. The empirical evidence in this chapter seeks to provide support for RQs 1, 2, and 5, in that it investigates the relationship between user demographics, offline psycho-social SNS use, connective online behaviours, and an individual's potential susceptibility to negative online experiences.

It should be noted that sections of the introduction, analyses, and discussion presented in Chapter 4 are partly presented in/based on an article published in an academic journal (Buglass et al., 2017a, and see Appendix 9 for further details).

### *4.2 Hypothesised model*

Previous research has alluded to a link between offline psycho-social vulnerabilities (e.g., self-esteem) and an individual's susceptibility to negative experiences (see Section 2.5, p.84). The present thesis extends the current knowledge base by considering psycho-social vulnerability in the context of an individual's reported level

of FOMO and its potential impact on online connective behaviours (e.g., online friending and self-disclosure). The research questions to be addressed in this chapter are:

*RQ1: Does FOMO influence an ego-centric SNS user's reported exposure to negative online experiences?*

*RQ2: Does FOMO influence the rate of connective behaviours (perceived and actual)?*

*RQ5: Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?*

To address these questions six hypotheses will be tested using a SEM based model (see Figure 4.1):

*H1.1: Individuals with higher levels of FOMO will report higher levels of exposure to negative online experiences.*

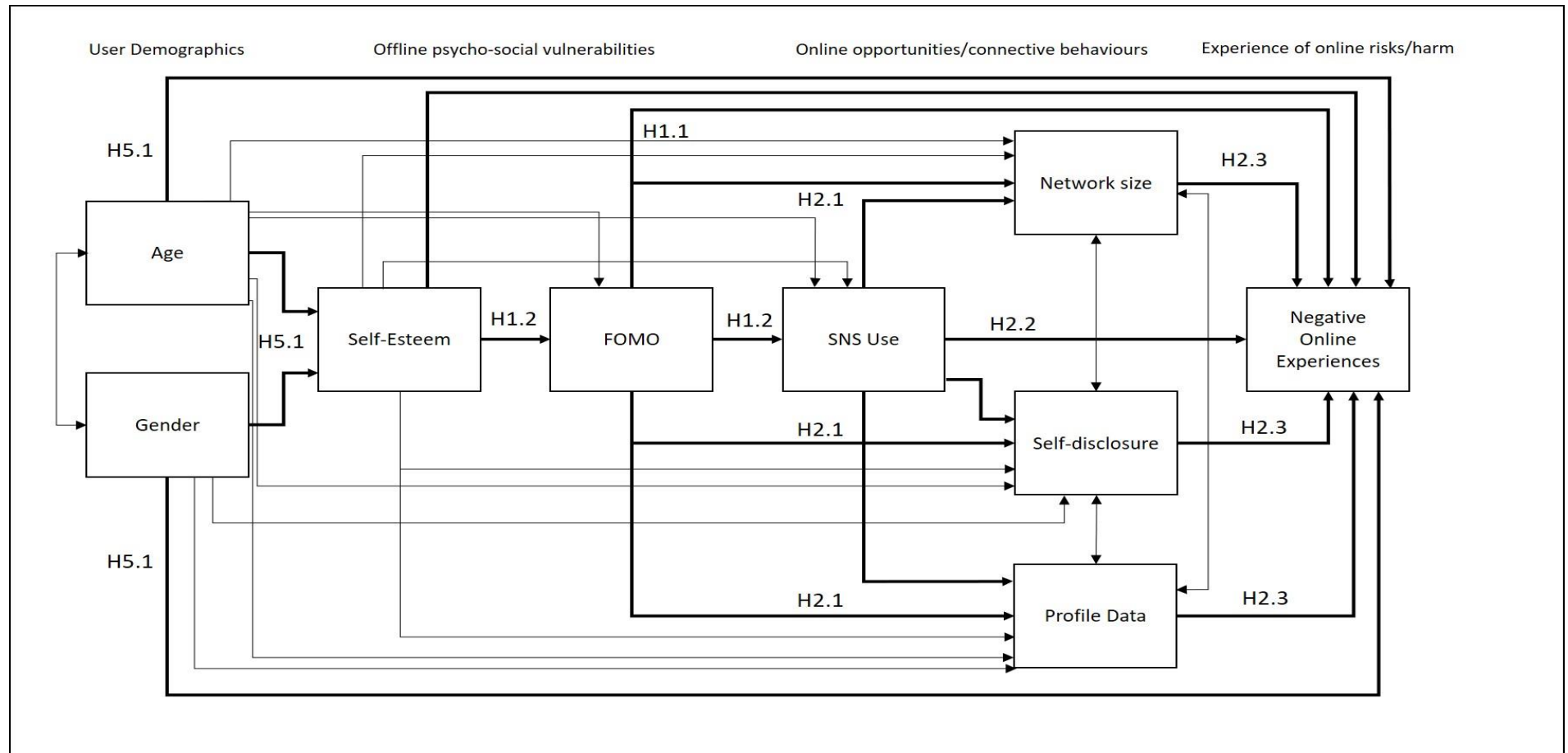
*H1.2: FOMO will mediate the relationship between a Facebook user's offline psychological vulnerability and their reported exposure to negative online experiences.*

*H2.1 Individuals with higher levels of FOMO will report higher levels of connective behaviours (e.g., self-disclosure and online friending).*

*H2.2 SNS use will mediate the relationship between FOMO and an individual's connective behaviours.*

*H2.3 SNS use and connective behaviours will mediate the relationship between FOMO and negative online experiences.*

*H5.1 The age and gender of SNS users will influence the reported level of exposure to negative online experiences.*



Key: bold = hypothesised path

Figure 4.1: Hypothesised model testing relationship between demographics, offline psycho-social vulnerabilities, connective behaviours and negative online experiences (showing all paths to be tested; bold lines = hypothesised paths)

### *4.3 Theoretical context*

The hypothesised model outlined in Figure 4.1 tests associations between psycho-social vulnerabilities, SNS use, and negative online experiences previously alluded to in the literature reviewed in Chapters 1 and 2. The model also tests several original, research specific associations denoted by the hypothesised paths. This section will provide a theoretical overview of how the model is constructed.

Individual differences in age and gender have the potential to influence an SNS user's reported psycho-social vulnerabilities, SNS use, online behaviours, and subsequent exposure to negative online experiences. A study by Correa, Hinsley, and Gil de Zúñiga (2009), using a national sample of US adults, showed age and gender differences in terms of SNS use were dependent on an SNS user's level of emotional instability. Furthermore, a study of Belgian adults (N = 1000; Mean Age = 43 years; 50% Male) by De Cock et al. (2014) suggested that age and gender were important predictors of SNS use, when psycho-social factors were considered.

In terms of connective behaviours, research into offline social networks has suggested that males tend to exhibit larger networks than females (Benenson, Nicholson, Waite, Roy, & Simpson, 2001; Crosnoe, 2000). However, little difference has been found in terms of network size on SNS (Lewis et al., 2008). Gender differences have also been found in the level of self-disclosure exhibited by SNS users. A study by Special and Barber (2012) of 127 Facebook users (18 – 24 years) showed that self-disclosure of profile information was significantly higher in male users. While, a study of the online privacy attitudes of 589 undergraduate students (18 – 24 years; 73% female) by Hoy and Milne (2010) found that women were more likely to engage in proactive privacy guarding behaviours to protect their online data and disclosures. In terms of negative



online experiences, the reporting of incidents is more commonly associated with female SNS users (Jones et al., 2013; Staksrud et al., 2013).

From the perspective of age, a wealth of literature has discussed apparent vulnerabilities to online risks and harm stemming from SNS use in specific age-defined populations of users (Davidson & Martellozzo, 2013; Livingstone et al., 2013; Staksrud et al., 2013). Higher levels of FOMO have also been attributed to younger SNS users (Przybylski et al., 2013). Age related differences in online connective behaviours have been demonstrated (Barker, 2012; Pfeil, Arjan, & Zaphiris, 2009). A study by Christofides et al. (2012) comparing the SNS behaviours of 288 adolescents and 285 adult Facebook users indicated that younger users tended to interact more frequently with SNS, share more personal data, and demonstrated a greater willingness to participate in online friending than their adult counterparts. While previous research suggests that it is likely that associations between psycho-social SNS use, online connective behaviours, and subsequent negative online experiences might differ dependent on the age and gender of the participants, the findings are not conclusive. Largely based on cohort studies, causal conclusions could not be readily drawn. It is therefore, important for this thesis to test such associations for the present sample (H5.1).

Cohort studies have previously linked low levels of self-esteem to higher levels of SNS and technology use (Ehrenberg, Juckes, White, & Walsh, 2008; Wilson, Fornasier, & White, 2010). Connecting and communicating with others online presents many opportunities for alleviating low self-esteem, providing individuals with an intrinsic motivation to engage with SNS platforms (see Chapter 1, Section 1.2.3, p. 23). FOMO, a form of social anxiety, has been shown to mediate this relationship (Przybylski et al., 2013), although at present the evidence is limited. In a

study of 2079 adults (Mean Age = 43.21, SD = 11.49, 50% male), Przybylski and colleagues demonstrated an association between low levels of offline life satisfaction/wellbeing and higher levels of FOMO, furthermore FOMO mediated the relationship between lower levels of offline life satisfaction/wellbeing and higher levels of SNS use. Linked to social comparison, FOMO is said to provide users with a “*pervasive apprehension that others might be having rewarding experiences from which one is absent*” (p.1841). This apprehension provides an extrinsic motivation for psycho-socially vulnerable users to engage in frequent social monitoring and engagement with SNS platforms, over and above the motivation to boost self-esteem. Offline psycho-social vulnerabilities have been previously linked to SNS user’s potential susceptibility to online negative experiences (Forest & Wood, 2012, Lee et al., 2012). It therefore, seems plausible that if FOMO might exacerbate an SNS user’s desire to use an online platform, it is likely that it can also exacerbate their susceptibility to online risks and harm. To date, FOMO has not been discussed in the realms of a Facebook user’s vulnerability towards negative online experiences, nor has its role as a potential mediator between a user’s offline self-esteem and negative online experiences been tested. The present thesis explores these associations (H1.1 and H1.2) and represents a unique contribution to the literature.

Associations between FOMO inspired SNS use and exposure to negative online experiences present an under-explored research landscape. As previously explained in Chapter 2 (see p. 57), Staksrud et al. (2013) suggest that being an online SNS user does not in itself make a person susceptible to negative online experiences. Vulnerability to such online risks and harms is instead dependent on the way in which an individual interacts with and uses the site. As such, online connective behaviours including the self-disclosure of profile content and emotions and, the accumulation of

large unmanageable online networks (Madden et al., 2013, Staksrud et al., 2013; Manago et al., 2012) have been cited as being contributory to an SNS user's online vulnerability.

It has been suggested that online connective behaviours might be driven by a user's extrinsic motivation to regulate their psycho-social needs deficits (Carpenter, 2012; Vorderer, Krömer, & Schneider, 2016; Williams, Cheung, & Choi, 2000). On Facebook, perceptions of social connectivity and belonging are borne from an individual's use of the site, through their ability to view and socially compare themselves against a constantly updating stream of multimedia content (e.g., status updates) and friending behaviours exhibited by members of their online network. This information is intended to provide the individual with a means of keeping updated with the social lives and interests of their connections. However, social monitoring on this scale has the capacity to be problematic. For example, viewing the status updates and photographs of a 'friend' at a party to which the individual user has not been invited has the potential to exacerbate existing perceptions and fears of being socially ostracised (e.g., FOMO), and thus drive higher levels of SNS use and connective behaviour. At present, no clear empirical evidence exists to suggest an explicit link between FOMO, SNS use, and online connective behaviours. It is therefore, the intention of this thesis to test these associations (H2.1 and H2.2) and in so doing provide a unique contribution to the literature.

Previous research has alluded to links between online connective behaviours and negative online experiences (Dredge et al., 2014). Concerns have been raised regarding increased self-disclosure and friending on SNS due to their apparent role in increasing opportunities for users to experience a range of negative online experiences such as exposure to gossip and rumours and data misuse (Davidson & Martellozzo,

2013; Debatin et al., 2009; see Chapter 2, Section 2.3.1 for an overview of online risks). It is therefore expected that one or indeed a combination of these behaviours, whilst potentially offering psychological and social benefits, will ultimately contribute to a higher capacity for users to experience online vulnerability when considered in the context of psycho-socially vulnerable SNS use (H2.3).

#### *4.4 Method*

The data presented in this chapter are derived from the first wave of an online self-report survey conducted between April 2014 and November 2015. The analyses consider a final sample of 489 UK based Facebook users, aged between 13 and 77 years old (20 years 11 months, SD = 10 years; 51% male). Measures of age, gender, psychological vulnerability (self-esteem), FOMO, SNS use, online connective behaviours (network size, profile data, and self-disclosure), and negative online experiences are reported. A comprehensive overview of the methods, measures, and sample is described in Chapter 3 (Section 3.6.1, p.117).

#### *4.5 Results*

The results section first explores descriptive statistics and bivariate associations for the main study variables. This is followed by a comprehensive test of the theoretical model using SEM analysis. Effects related to gender and age are also examined (RQ5).

##### *4.5.1 Descriptive statistics and bivariate analysis of the main study variables*

Descriptive statistics and bivariate correlations for all main study variables were calculated (Table 4.1). Mean totals for latent variables were calculated using the CFA

defined constructs discussed in Chapter 3 (see Section 3.6.1.2, p.120). Due to the directional hypotheses tested in this chapter, one-tailed significance values are reported for all correlations.

Table 4.1: Descriptive statistics and bivariate correlations for the full sample ( $N = 489$ ; Male = 247, Female = 242)

	Mean (SD)	$\alpha$	1	2	3	4	5	6	7	8
<i>Full Sample</i>										
1. SNS Use	2.54 (1.48)	-		.26**	.25**	-.08	.14**	.33**	.30**	.05
2. FOMO	1.99 (.78)	.88			.28**	-.28**	.18**	.28**	.27**	-.05
3. Negative online experiences	2.52 (1.09)	.91				-.22**	.28**	.16**	.33**	-.12**
4. Self-Esteem	2.95 (.56)	.88					-.09*	-.04	-.03	.17**
5. Network Size	424.28 (419.46)	-						-.01	.29**	-.19**
6. Self-Disclosure	2.00 (.79)	.88							.28**	.03
7. Profile Data	8.48 (3.46)	-								-.04
8. Age	20.88 (10.12)	-								

$d.f. = 487$ ; \*\* $p < .001$ ; \* $p < .01$  (one-tailed);  $\alpha$  = Cronbach's Alpha

No significant association was found between self-esteem and SNS use ( $p > .01$ ). However, the significant association between both variables and FOMO, provided a good indication that a mediation effect, in line with previous literature (Przybylski et al., 2013) was plausible. Furthermore, the significant association between lower levels of self-esteem and higher levels of negative online experiences ( $p < .001$ ) supported the notion that there might be a relationship between individuals with psycho-social vulnerabilities and exposure to negative online experiences.

In terms of the role of FOMO, correlational support was found for all FOMO hypotheses tested for RQs 1 and 2. Higher levels of FOMO were significantly associated with higher levels of reported negative online experiences (H1.1;  $p < .001$ ) and all three types of connective online behaviours tested (H2.1; all  $p < .001$ ). This indicated that higher levels of FOMO were associated with individuals reporting higher rates of online friending (network size) and self-disclosure. Higher levels of FOMO were also significantly associated with lower levels of self-esteem ( $p < .001$ ) and higher levels of SNS use ( $p < .001$ ). This indicated that those reporting higher levels of FOMO might be more likely to also report higher levels of offline vulnerability and online usage. Together, these associations provided good grounds for a more extensive analysis of paths and potential mediating effects (Rucker, Preacher, Tormala, & Petty, 2011) proposed in H1.2 and H2.2. This was undertaken using SEM.

Potential age biases in the sample were addressed in the correlational analysis. Significant associations between age and negative online experiences, self-esteem, and network size were evident ( $p < .001$ ), providing support for H5.1. The associations indicated that reported negative online experiences and network sizes were lower with age and reported rates of reported self-esteem were higher. The significant role of age,

while not apparent for all main study variables, signalled that potential age biases in the sample should be controlled for and tested in the more complex SEM analysis.

#### 4.5.1.2 Testing for gender differences in the sample means

An analysis of sample means differences for all main study variables (Table 4.2) was conducted to test for possible gender effects (RQ5, H5.1). Independent t-tests, using gender as the independent variable, are reported.

*Table 4.2: Sample means and standard deviations for male and female participants (Male = 247, Female = 242)*

	Male	Female
1. SNS Use	2.27 (1.52)**	2.81 (1.34)**
2. FOMO	1.84 (.74)**	2.15 (.79)**
3. Negative online experiences	2.32 (1.06)**	2.73 (1.09)**
4. Self-Esteem	3.03 (.54)**	2.85 (.57)**
5. Network Size	391.09 (344.57)	458.16 (482.50)
6. Self-Disclosure	2.00 (.85)	2.00 (.72)
7. Profile Data	7.83 (3.68)**	9.14 (3.10)**
8. Age	18.31 (8.54)**	23.50 (10.91)**

*N* = 489; \*\**p* < .001; \**p* < .01

Several significant differences were found between the sample means for male and female participants. The female sample of 242 participants were significantly older than the male sample of 247 participants,  $t(456) = 5.85, p < .000$ . The difference in age was reflective of a larger number of the male participants being from the school-based sampling panel. Differences were also evident for SNS use,  $t(487) = 4.05, p < .000$ , FOMO,  $t(487) = 4.56, p < .000$ , self-esteem,  $t(487) = 3.56, p < .000$ , negative online



experiences,  $t(487) = 4.26, p < .000$ , and profile data,  $t(487) = 4.26, p < .000$ . This indicated that for this sample, females reported being more psycho-socially vulnerable, disclosed more profile information, and reported higher rates of exposure to negative online experiences. No significant differences between the gender groups were evident for network size and emotional self-disclosure ( $p > .05$ ). The significant mean differences highlighted the importance of controlling and testing for gender sample biases in the SEM based analysis.

#### *4.5.2 SEM modelling*

Correlations can provide a good indication of the strengths of associations between variables, however, they do not distinguish direct effects between variables from indirect effects. To explore these effects in more detail the present thesis uses SEM based path analysis. In doing so, the path model will demonstrate whether the hypothesised model outlined in Figure 4.1 (p.174) can explain the correlations previously shown in Table 4.1 (p.181). SEM analysis is conducted using AMOS v.21 (Arbuckle, 2014).

##### *4.5.2.1 Model preparation*

The model described in this chapter uses the latent factor structures previously described in Chapter 3 (see Section 3.6.1.2, p.120). Prior to the SEM path analysis an overall measurement model, combining the CFA derived latent variables (self-esteem, FOMO, self-disclosure, and negative online experiences) was tested to ensure all latent factors when combined provided an appropriate fit to the data (see Appendix 7). All items loaded onto their corresponding factors significantly (all  $p < .001$ ). Model fit statistics were compared against recommended values for CFI, RMSEA, TLI, and

SRMR as described in Chapter 3 (p.144). The full measurement model provided a just acceptable fit to the data,  $\chi^2 (605) = 1280.76, p < .001$ , CFI = .94, RMSEA = .05 [.06, .07], TLI = .93, SRMR = .02.

To optimise the model fit, a measurement model using parcelled latent variables was tested. Where scales had >5 items remaining after initial CFA analysis (FOMO, self-esteem, and self-disclosure), items were summed to create composite measures to test the latent factor structure. A full overview of the parcelling procedure can be found in Appendix 8. The model fit for the parcelled measurement model was excellent,  $\chi^2 (199) = 348.19, p < .001$ , CFI = .98, RMSEA = .02 [.03, .05], TLI = .97, SRMR = .04, and a significant improvement,  $\Delta\chi^2 (406) = 932.57, p < .001$ , on the fit demonstrated for the original non-parcelled measurement model. The parcelled latent variables were therefore used in the analysis of the final structural path model.

#### *4.5.2.2 Testing the structural path model*

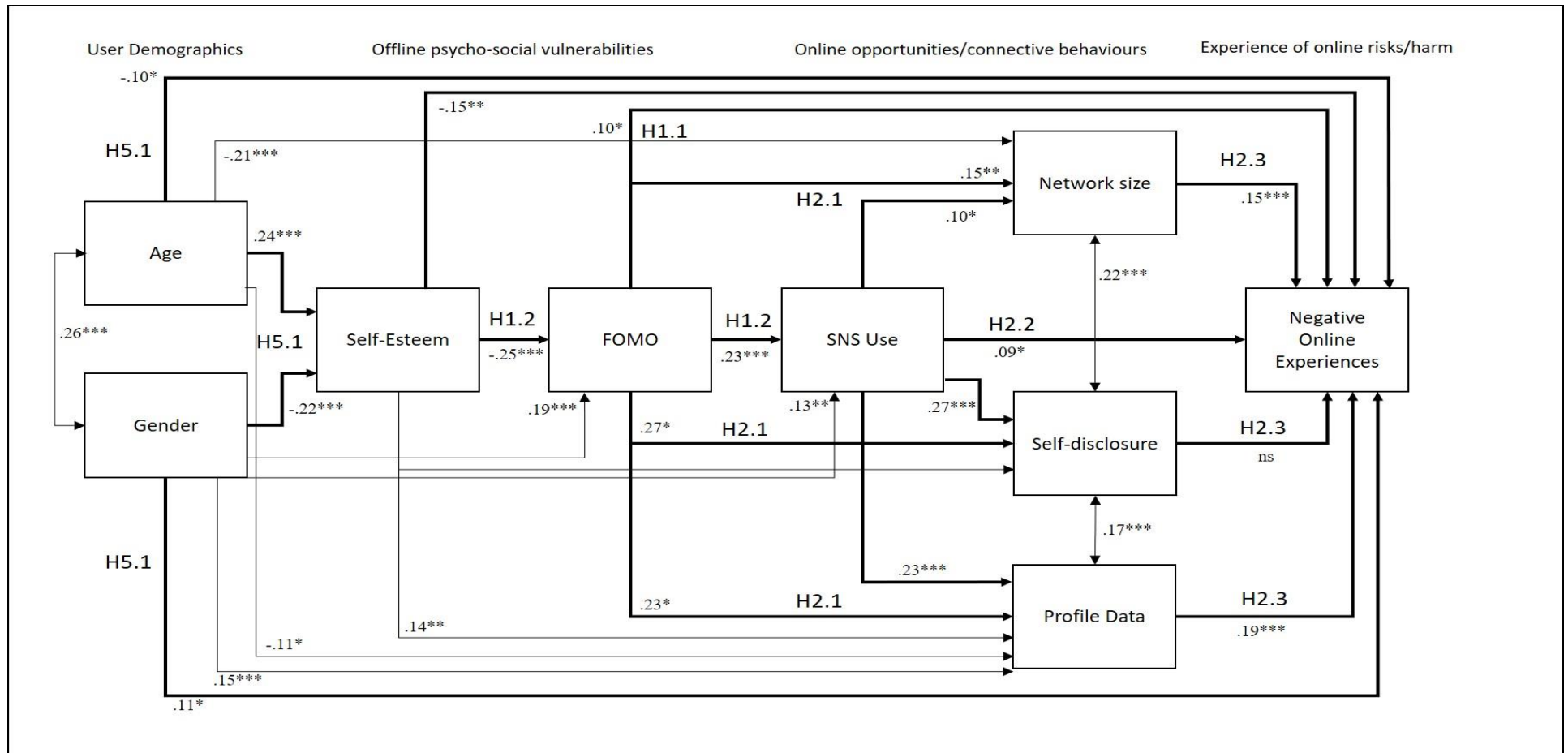
The final structural model was tested with the addition of single-item observed variables (age, gender, SNS use, network size, and profile information). The model was a good fit to the data,  $\chi^2 (290) = 593.97, p < .001$ ; CFI = .96, SRMR = .12, TLI = .95, RMSEA = .05 CI [.04, .05], with an acceptable item to sample ratio of 1:7. All items loading onto latent variables were strong (>.6) and significant (all  $p < .001$ ).

Table 4.3 illustrates the bootstrapped path coefficients for the full sample. To explore potential mediation effects between variables all coefficients regardless of significance are reported.

Table 4.3: Path coefficients for tested structural model ( $N = 489$ , Male = 247, Female = 242)

Path	B [95% BCI]	$\beta$	S.E.	p (2-tailed)	p (1-tailed)
Age → Self-esteem	<b>.013 [.008, .018]</b>	<b>.238</b>	<b>.050</b>	<b>.001</b>	<b>.001</b>
Age → FOMO	-.003 [-.01, .003]	-.058	.050	.297	.149
Age → SNS Use	.004 [-.008, .018]	.027	.044	.522	.261
Age → Network size	<b>-.044 [-.067, -.014]</b>	<b>-.212</b>	<b>.067</b>	<b>.005</b>	<b>.003</b>
Age → Self-disclosure	.003 [-.001, .005]	.079	.049	.114	.057
Age → Profile data	<b>-.036 [-.066, -.003]</b>	<b>-.105</b>	<b>.048</b>	<b>.032</b>	<b>.016</b>
Age → Negative OE	<b>-.011 [-.020, -.002]</b>	<b>-.106</b>	<b>.043</b>	<b>.022</b>	<b>.011</b>
Gender → Self-esteem	<b>-.239 [-.348, -.131]</b>	<b>-.220</b>	<b>.049</b>	<b>.001</b>	<b>.001</b>
Gender → FOMO	<b>.217 [.106, .323]</b>	<b>.186</b>	<b>.047</b>	<b>.001</b>	<b>.001</b>
Gender → SNS Use	<b>.371 [.094, .647]</b>	<b>.125</b>	<b>.048</b>	<b>.009</b>	<b>.005</b>
Gender → Network size	.302 [-.094, .695]	.072	.048	.135	.068
Gender → Self-disclosure	-.030 [-.089, .027]	-.045	.045	.322	.161
Gender → Profile data	<b>1.029 [.428, 1.642]</b>	<b>.149</b>	<b>.044</b>	<b>.001</b>	<b>.001</b>
Gender → Negative OE	<b>.251 [.052, .450]</b>	<b>.105</b>	<b>.046</b>	<b>.014</b>	<b>.007</b>
Self-esteem → FOMO	<b>-.272 [-.395, -.164]</b>	<b>-.253</b>	<b>.051</b>	<b>.001</b>	<b>.001</b>
Self-esteem → SNS use	-.004 [-.299, .329]	.001	.059	.975	.488
Self-esteem → Network size	.081 [-.268, .449]	.021	.046	.631	.316
Self-esteem → Self-disclosure	.016 [-.045, .080]	.027	.053	.581	.291
Self-esteem → Profile data	<b>.886 [.268, 1.527]</b>	<b>.139</b>	<b>.051</b>	<b>.006</b>	<b>.003</b>
Self-esteem → Negative OE	<b>-.308 [-.544, -.064]</b>	<b>-.151</b>	<b>.058</b>	<b>.013</b>	<b>.007</b>
FOMO → SNS use	<b>.577 [.315, .836]</b>	<b>.228</b>	<b>.052</b>	<b>.001</b>	<b>.001</b>
FOMO → Network Size	<b>.541 [.177, .985]</b>	<b>.150</b>	<b>.055</b>	<b>.003</b>	<b>.002</b>
FOMO → Self-disclosure	<b>.148 [.091, .205]</b>	<b>.265</b>	<b>.049</b>	<b>.001</b>	<b>.001</b>
FOMO → Profile data	<b>1.343 [.754, 1.914]</b>	<b>.227</b>	<b>.048</b>	<b>.001</b>	<b>.001</b>
FOMO → Negative OE	<b>.195 [-.004, .430]</b>	<b>.103</b>	<b>.060</b>	<b>.078</b>	<b>.039</b>
SNS use → Network size	<b>.141 [.014, .271]</b>	<b>.099</b>	<b>.045</b>	<b>.031</b>	<b>.016</b>
SNS use → Self-disclosure	<b>.059 [.039, .081]</b>	<b>.269</b>	<b>.045</b>	<b>.001</b>	<b>.001</b>
SNS use → Profile data	<b>.542 [.333, .750]</b>	<b>.232</b>	<b>.045</b>	<b>.001</b>	<b>.001</b>
SNS use → Negative OE	<b>.069 [-.006, .143]</b>	<b>.092</b>	<b>.050</b>	<b>.076</b>	<b>.038</b>
Network size → Negative OE	<b>.081 [.027, .133]</b>	<b>.154</b>	<b>.049</b>	<b>.002</b>	<b>.001</b>
Self-disclosure → Negative OE	.230 [-.117, .587]	.068	.051	.184	.092
Profile data → Negative OE	<b>.059 [.028, .093]</b>	<b>.185</b>	<b>.051</b>	<b>.001</b>	<b>.001</b>

OE = online experiences; bold text = significant path



Key: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Figure 4.2: Illustration of direct paths and standardised coefficients ( $N = 489$ , Male (coded as 0) = 247, Female (coded as 1) = 242) for the structural SEM model. All hypothesised and significant additional paths are shown (bold lines = hypothesised paths).

The findings from the path model are considered for each variable in turn, from the initial predictor variables of age and gender (on the left side of Fig. 4.2) to the outcome variable negative online experiences. Indirect effects reported in the text were tested using a bootstrapped 95%CI analysis of indirect effects in AMOS. Reported indirect paths were all significant at  $p < .05$ .

Age had a positive direct influence on self-esteem, in that older Facebook users reported being less psychologically vulnerable. The correlational analysis had demonstrated that the only connective behaviour associated with age was network size. However, in the path model, age had a negative direct influence on network size and profile data. Older Facebook users reported having smaller networks of online connections and having less overall information on their Facebook profile. In support of H5.1, age had a direct influence on the reported rate of exposure to negative online experiences, with older Facebook users reporting less frequent exposure. Furthermore, a significant indirect effect between age, self-esteem, FOMO, and negative online experiences,  $\beta = .001$  [.001, .002],  $p < .001$ , indicated that the extent to which the age of Facebook users impacted their vulnerability to negative online experiences, was mediated by their offline psycho-social vulnerabilities. There were no significant direct effects of age on FOMO, SNS use, or self-disclosure ( $p > .05$ ).

The direct effects found for gender complemented the comparison of sample means analysis conducted in Section 4.5.1.2 (p. 183). Gender had a direct influence on self-esteem, in that female Facebook users reported being more psychologically vulnerable. Gender directly influenced both FOMO and SNS use, with females reporting being more socially anxious and having higher levels of SNS engagement. In terms of online connective behaviours, gender had a positive direct influence on profile data, in that females reported disclosing more overall information on their

Facebook profile. In support of H5.1, gender had a direct influence on the reported rate of exposure to negative online experiences, with female Facebook users reporting more frequent exposure. Furthermore, a significant indirect effect between gender, self-esteem, FOMO, and negative online experiences,  $\beta = .020$  [.010, .040],  $p < .001$ , indicated that the extent to which the gender of Facebook users impacted their vulnerability to negative online experiences, was mediated by their offline psychosocial vulnerabilities. There were no significant direct effects of gender on network size or self-disclosure ( $p > .05$ ).

Self-esteem had a direct influence on negative online experiences. Over and above the direct effects of age and gender, psychologically vulnerable Facebook users reported higher levels of exposure to negative online experiences. Self-esteem also had a negative direct influence on FOMO. In contrast to the non-significant correlational analysis, self-esteem was found to have a direct influence on profile data. Facebook users with higher self-esteem disclose more overall information on their Facebook profile. There was no significant direct effect of self-esteem on SNS use, network size, or self-disclosure ( $p > .05$ ).

FOMO had a direct positive influence on SNS use. In line with previous literature (see Chapter 1, p.47), a significant indirect effect was found with FOMO mediating the relationship between self-esteem and SNS use,  $\beta = -.190$ [-.302, -.111],  $p < .001$ . The extent to which a Facebook user's psychological vulnerability impacted SNS use, was dependent on their reported level of FOMO. In terms of the thesis specific hypotheses, the path model provided support for RQ H1.1, as FOMO positively influenced negative online experiences. Facebook users reporting higher levels of FOMO reported higher rates of exposure to negative online experiences. It should be noted however, that the direct effect was only significant when testing with a directional

one-tailed *p*-value. Despite this modest direct effect, a significant indirect effect indicated that FOMO mediated the relationship between self-esteem and negative online experiences,  $\beta = -.130 [-.211, -.069]$ ,  $p < .001$ . Providing support for H1.2, this indicated that the extent to which a Facebook user's psychological vulnerability influenced their reported exposure to negative online experiences was dependent on their reported level of FOMO.

Support for RQ2 H2.1 was also evident. FOMO directly influenced all three online connective behaviours. Facebook users reporting higher levels of FOMO reported higher levels of network size (online friending) and disclosure, both in terms of profile data and emotional self-disclosure. An analysis of indirect effects rendered mixed results. SNS use only provided a mediating role in the relationship between FOMO and profile data,  $\beta = .244 [.129, .407]$ ,  $p = .002$ , and self-disclosure,  $\beta = .070 [.039, .112]$ ,  $p < .001$ . In both cases, the extent to which a Facebook user's social anxiety influenced their online behaviours was dependent on the amount of time they spent on the platform (H2.2). Despite the significant direct effects evident between FOMO, SNS use and network size, an analysis of indirect effects rendered the cumulative path non-significant ( $p = .079$ ).

Finally, in terms of connective online behaviour, network size, and profile data both directly influenced negative online behaviours. Facebook users reporting larger online networks and higher rates of profile information reported higher levels of exposure to negative online experiences. There was no significant direct effect between emotional self-disclosure and negative online experiences ( $p > .05$ ). An analysis of indirect effects indicated that the relationship between FOMO and negative online experiences was mediated by network size,  $\beta = .050 [.018, .086]$ ,  $p = .016$ , and profile data,  $\beta = .091 [.052, .148]$ ,  $p = .002$ . The extent to which Facebook users exhibiting higher

levels of FOMO were exposed to negative online experiences, was seemingly influenced by the rate at which they connected to people online and the amount of information they were willing to disclosure on their profile. There was also more complex serial indirect effect present with SNS use and profile data,  $\beta = .020$  [.011, .040],  $p = .002$ , with both mediating the relationship between FOMO and negative online experiences. Indirect effects involving self-disclosure as a potential mediator were not significant ( $p > .05$ ). These results therefore provided partial support for H2.3.

#### *4.6 Discussion*

The present analysis explored the potential associations between SNS user demographics, psycho-social vulnerabilities, online connective behaviours, and negative online experiences. Using SEM based analysis of a cross-sectional self-reported dataset; the results provide an insight into the behavioural predictors of online negative experiences. The main findings can be summarised as follows. First, direct support for a relationship between FOMO and negative online experiences (H1.1) was evident, such that higher levels of FOMO positively influenced the level of negative online experiences reported. Second, a FOMO mediated association between an individual's level of psychological vulnerability and exposure to negative online experiences (H1.2) was supported; a significant indirect effect linked lower levels of self-esteem to higher negative online experiences, via higher levels of FOMO. Third, support was also garnered for associations between FOMO and online connective behaviours (H2.1). Higher levels of FOMO positively influenced levels of all three connective behaviours tested (self-disclosure, profile data disclosure, and online friending – network size). Furthermore, H2.2 was also supported, with SNS use



providing a positive mediating influence between FOMO and all online connective behaviours. Partial support was found for H2.3. Indirect effects demonstrated that SNS use and two of the online connective behaviours (profile data disclosure and online friending - network size) positively mediated the association between FOMO and negative online experiences. Self-disclosure was not a significant mediator. Finally, support was rendered for demographic differences (H5.1). Age and gender effects were demonstrated on direct and indirect associations. Being younger and female was more likely to influence higher levels of psycho-socially vulnerable SNS use and subsequent negative online experiences.

The direct influence of psychological vulnerability (self-esteem) on SNS use was non-significant in all analyses. While at odds with previous research into the purported psycho-social motivations of engaging in SNS (Forest & Wood, 2012; Mehdizadeh, 2010), this result was not entirely unexpected. Motivations for SNS use vary between individuals. Therefore, while SNS use can indeed provide individuals experiencing psychological vulnerabilities (e.g., low self-esteem) a number of beneficial psycho-social opportunities, SNS also provides opportunities to individuals already displaying higher levels of psychological wellbeing. Akin to findings from other areas of digital technology research, this would suggest that a consistent and simple direct psychological effect of SNS use may be non-existent (McKenna & Bargh, 2000).

FOMO provides a bridge between several of the tested variables. In line with the theorisation of Przybylski et al. (2013), FOMO acted as a mediator in the non-significant direct relationship between self-esteem and SNS use. The indirect effect, suggests that an individual's level of social anxiety plays an important role in determining the extent to which a psychologically vulnerable user might turn to SNS as a means of seeking psycho-social gratification. Furthermore, an original

contribution of this thesis, is that it shows that FOMO has the potential to act as a mediator in the relationship between psychological vulnerability and negative online experiences (H2.2). Findings indicated that individuals lower in self-esteem and reporting higher levels of FOMO, were associated with higher reported levels of negative online experiences reported.

Another original contribution of this analysis is in demonstrating the role that FOMO has on an SNS users online connective behaviours. Whilst, increased SNS use has been previously shown to increase an individual's opportunity to engage in such behaviours (e.g., Joinson et al., 2011; Papacharissi & Medelson, 2010), an explicit link with FOMO has not been made. Direct and indirect effects indicated that FOMO positively influenced self-reported levels of self-disclosure (emotional and profile data) and online friending (network size), with SNS use offering a mediating role. A possible reason for this is that the use of SNS promotes social surveillance. In the past, an individual may not have realised that their best friend had gone to the cinema or a party without them. The advent of SNS, however, means that such an event is unlikely to go unnoticed, with even the most mundane of activities being documented in their minutiae by some users. For users prone to social anxiety in the offline world, it has been suggested that frequent exposure to such Facebook posts (via SNS use) has the capacity to illicit the belief in users that their connections are leading happier and more desirable lives than their own due to engagement in upward social comparisons (Chou & Edge, 2012). As such, the more an individual engages with such content, the more likely it is that they might feel that they are missing out, and subsequently engage in online connective behaviours to compensate for psycho-social deficits they might be perceiving. In addition, any pre-existing tendency to engage in social surveillance

could drive people to make more use of the technology that now allows for social monitoring.

The hypothesised impact of FOMO on online vulnerability was slightly more mixed. Being significant to a one-tailed  $p$ -value only, the direct relationship between FOMO and negative online experiences was not as strong as expected (H1.1). The association was however, positively mediated (H2.3) by both SNS use and two of the online connective behaviours (disclosure of profile data and online friending – network size). These findings supported previous theories that individuals experiencing feelings of FOMO might turn to such behaviours to compensate for their feelings of social inadequacy (Przybylski et al., 2013). The present study, however, highlighted that in doing so they might inadvertently be leaving themselves open to increased vulnerability to online risks and harm by engaging in one or more FOMO driven behaviours online. The non-significant effect of self-disclosure on negative online experiences was somewhat surprising. However, in light of the significant effect of profile data disclosure, it indicates that it might not necessarily be an individual's likelihood of posting emotionally charged content that is risky per se, but rather the accumulation of different types of data (emotional and demographic) on the SNS user's profile.

Potential limitations of the present study are in the use of item parcelling (see Appendix 8) and the sampling procedure used (see Chapter 3, Section 3.4, p.108). The sample size for the dataset, while large enough to facilitate the models presented, lacked the power to perform non-parcelled complex SEM models. It has been suggested that parcelling may reduce sample size estimation bias (Little et al., 2013). However, there are concerns about potential information loss due to the collapsing of variables (Bandalos, 2008). Furthermore, the self-selected nature of the sample

prevents the results of this chapter being generalisable to the wider Facebook community. It is therefore acknowledged that future research should look to source larger representative samples.

The age and gender findings in this study offer an interesting opportunity for future study. The present study has clearly demonstrated age and gender differences are apparent in the way in which some of the main study variables contribute to a SNS user's online vulnerability. While the findings of the present study provide an indication of where the differences might lie, further research is required to fully develop the potential of such differences in terms of how they might be best exploited in areas such as the development of online safety interventions (e.g., directly addressing ways in which female users can manage FOMO in a bid to promote safer friending habits) and platform design (e.g., using the user interface to provide age or gender specific usage tips).

To conclude, the results presented in this chapter further our understanding of the potential detrimental effects that psycho-socially vulnerable SNS use can have on an individual's susceptibility to negative online experiences. However, it should be noted that the cross-sectional approach provides only a snapshot of user behaviour. Cohort studies of this type do not provide an indication of a variables impact over time, leaving many questions of causality unanswered. Therefore, longitudinal analysis is required to test these associations further. To this end, Chapter 5 provides a longitudinal perspective of the findings so far discussed.

## **Chapter 5: Exploring the longitudinal relationships between psycho-social vulnerability, SNS use, online connective behaviours and negative online experiences.**

### *5.1 Chapter introduction*

Chapter 5 extends the analyses presented in Chapter 4. Specifically, it seeks to determine whether the associations between offline psycho-social vulnerabilities (e.g., self-esteem and FOMO), SNS use, online connective behaviours, and negative online behaviours previously discussed in the cross-sectional model hold over time. In doing so, the longitudinal analysis provides a greater insight into the potential causal relationships between the variables. To this end, a two-phase longitudinal analysis using structural equation modelling (SEM) is reported. The evidence presented in this chapter provides support for RQ3, testing H3.1, H3.2, H3.3, H3.4, and H3.5, and RQ 5, testing H5.1.

It should be noted that sections of the introduction, analyses, and discussion presented in Chapter 5 are partly presented in/based on an article published in an academic journal (Buglass et al., 2017a, and see Appendix 9 for further details).

### *5.2 Hypothesised model*

As previously discussed in Chapter 1 (p.24), McKenna and Bargh (2000) have suggested that a consistent and simple main effect of digital technology research might not exist. Research into digital technology often seeks to address impact in terms of a cross-sectional cause and effect, leading sometimes to contradictory or conflicting

outcomes (e.g., Amichai-Hamburger & Furnham, 2007; Kraut et al., 1998; Valkenburg & Peter, 2011; Zulkefly & Baharudin, 2009).

Recent studies on media effects have stated that digitally related cause and effect relationships might be more complex, suggesting longitudinal reciprocal relationships between variables to produce what has been termed “*a reinforcing spiral*” (Slater, 2007, p.281). Such spirals have been evidenced in a range of media-based studies looking at aggression (Slater, Henrym, Swaim, & Anderson, 2003), sexual behaviour (Bleakley, Hennessy, Fishbein, & Jordan, 2008), and smoking (Slater & Hayes, 2010). In the realms of social media, such reciprocal relationships have been explored in terms of self-disclosure. A longitudinal survey study of 566 (13 – 65 years,  $M = 25.62$  years,  $SD = 6.50$  years; 59% female) German SNS users by Trepte and Reinecke (2013) reported a reciprocal relationship between SNS use and self-disclosure, with individuals who demonstrated an increased disposition towards self-disclosure, engaging more actively with SNS, which in turn increased their overall disposition to self-disclose online.

It has been suggested that individuals experiencing offline psycho-social vulnerabilities, such as low self-esteem and/or FOMO, may find themselves in a spiral of behaviour, termed a state of “*self-regulatory limbo*” by Przybylski et al. (2013, p.1842), in which they seek to reaffirm their identity and self-esteem by spending an increasing amount of time online. This in turn may lead to further FOMO, an increased capacity for online connective behaviours (e.g., self-disclosing and friending behaviours), and ultimately further decreases in both online (e.g., negative online experiences) and psychological wellbeing. To date this cycle of behaviour has not been tested empirically. Therefore, to test the potential effects of this “limbo” this chapter builds on the analysis presented in Chapter 4 (see Section 4.5, p.179) by exploring the

longitudinal effects of offline psychological vulnerability, FOMO, SNS use, and online connective behaviours on reported exposure to negative online experiences.

The full theoretical background for the hypotheses presented in this chapter has been outlined previously in the literature reviewed in Chapters 1 and 2, and the theoretical context outlined in Chapter 4 (see Section 4.3, p.175). In light of the literature presented and the cross-sectional evidence provided in Chapter 4, the research questions to be addressed in this chapter are:

*RQ3: Do psychologically vulnerable users demonstrate an increased capacity to enter a potentially detrimental spiral of online behaviour over time?*

*RQ5: Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?*

To address these questions five hypotheses will be tested using a SEM based model (see Figure 5.1 for hypothesised model):

*H3.1 Individuals with negative psycho-social motivations will report higher levels of SNS use over time.*

*H3.2: Individuals with negative psycho-social motivations will report higher levels of connective behaviour over time.*

*H3.3: Individuals with negative psycho-social motivations will report higher rates of exposure to negative online experiences over time.*

*H3.4 Individuals with higher levels of SNS use and connective behaviours will report higher levels of psycho-social vulnerability over time.*

*H3.5 Individuals with higher levels of SNS use and connective behaviours will report higher levels of exposure to negative online experiences over time.*

*H3.6 Individuals with higher levels of exposure to negative online experiences will report higher levels of negative psycho-social wellbeing over time.*

*H5.1 The age and gender of SNS users will influence the reported level of exposure to negative online experiences.*



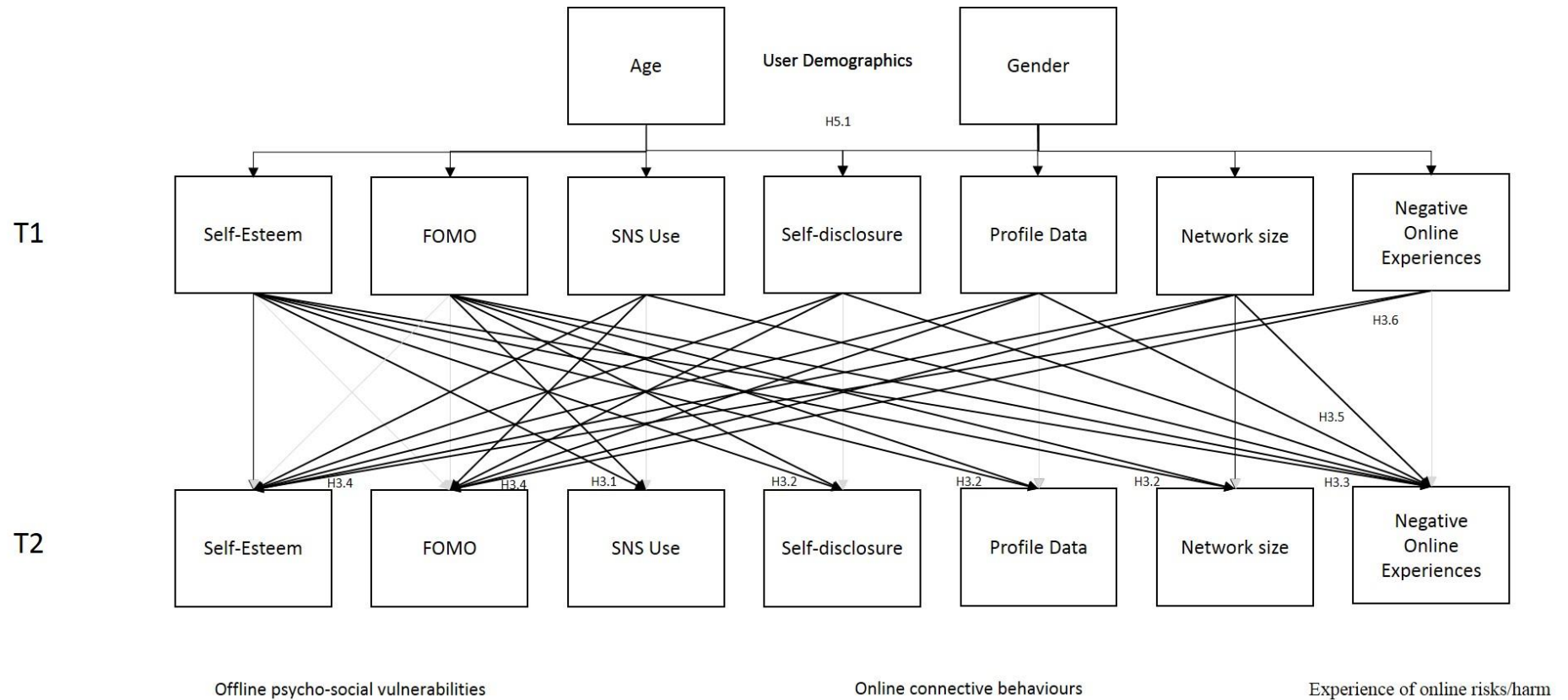


Figure 5.1: Hypothesised model for the temporal associations between variables (showing all tested paths)

The longitudinal hypotheses presented in this chapter have been adapted from the cross-sectional hypotheses outlined in Chapter 4 (see Section 4.2, p.172). While, it is acknowledged that ‘reinforcing spirals’ are best captured over three waves of data (Slater, 2007), participant attrition (see Chapter 3, Section 3.6.1.3.2.1, p.139) rendered this implausible for the present analyses. A precedent for exploring the reciprocal nature of digital technology variables over two waves has been previously set by Trepte and Reinecke (2013). To test the potential influencing role of age and gender in the longitudinal analysis, links between both and all T1 variables were tested (H5.1).

### *5.3 Method*

The data presented in this chapter are derived from the first and second waves of a longitudinal online self-report survey conducted between April 2014 and November 2015. Measures of psycho-social vulnerability (self-esteem and FOMO), SNS use, online connective behaviours (i.e., friending (assessed as network size) and disclosure (assessed as profile data and self-disclosure)), and negative online experiences are reported. One hundred and seventy-five of the original sample of UK based Facebook users, aged between 13 and 77 years old (Mean Age = 20 years 6 months; SD = 10 years 0 months; 48% male), responded to two waves of the online survey. This represented approximately 35% of the overall sample. Attrition analysis with *t*-tests was used to compare the main study variables at T1 and T2. No significant systematic attrition was found. A comprehensive overview of the methods, measures, sample characteristics, and attrition analysis is described in Chapter 3 (starting from Section 3.6.1, p.117).

## 5.4 Results

### 5.4.1 Descriptive statistics and bivariate analysis of the main study variables

Mean totals and bivariate correlations (Table 5.1) were calculated using the CFA defined constructs (see Chapter 3 see Section 3.6.1.2, p.120). Considering the directional longitudinal hypotheses one-tailed significance values are reported for all correlations.

Complementing the associations found in Chapter 4, partial support was evident for H3.1. Self-esteem at T1 did not significantly influence SNS use at T2,  $p > .01$ . However, higher levels of FOMO at T1 were associated with higher levels of SNS use at T2,  $r = .32, p < .001$ . Partial correlational support was found for H3.2. Higher levels of FOMO at T1 were positively associated with all three types of connective online behaviour at T2, network size,  $r = .29, p < .001$ , self-disclosure,  $r = .27, p < .001$ , and profile data,  $r = .19, p < .01$ . However, only network size at T2 was significantly associated with self-esteem at T1,  $r = -.20, p < .01$ . In support of H3.3 lower levels of self-esteem (psychological vulnerability) were associated with higher reported levels of exposure to negative online experiences at T2,  $r = -.26, p < .001$ . Higher levels of FOMO at T1 were also associated with higher levels of negative online experiences at T2,  $r = .31, p < .001$ . Together these correlations indicated that those individuals who were more vulnerable in the offline world at T1 were more likely to be associated with higher reported rates of SNS use, online friending, self-disclosure, and online negative online experiences over time.

Partial correlational support was also found for H3.4. SNS use at T1 was significantly associated with higher levels of FOMO at T2,  $r = .37, p < .001$ . No significant association was found with self-esteem. In terms of the connective behaviours, no connective behaviours at T1 were significantly associated with self-esteem at T2,  $p >$

.01. Network size,  $r = .18$ ,  $p < .01$ , and self-disclosure,  $r = .24$ ,  $p < .01$ , at T1 were associated with FOMO at T2, such that higher levels of network size and self-disclosure at T1 were associated with higher levels of FOMO at T2. Correlations between SNS use and online connective behaviours and negative online experiences fully supported H3.5, such that all correlations were significant and positive,  $p < .01$ . This indicated that higher levels of use, friending, profile information, and self-disclosure at T1 were all associated with higher reported levels of negative online experiences over time. Partial support was found for H3.6. Higher levels of negative online experiences were associated with higher levels of social anxiety (FOMO) at T2,  $r = .24$ ,  $p < .01$ . However, no significant association with self-esteem was evident,  $p > .01$ .

In terms of the influence of age (T1), significant associations were evident with network size at both T1,  $r = -.31$ ,  $p < .001$ , and T2,  $r = -.27$ ,  $p < .001$ . At both time points older SNS users were more likely to be associated with having smaller online networks. Age was also found to significantly influence negative online experiences at T1,  $r = -.16$ ,  $p < .01$ , and profile information at T2,  $r = -.14$ ,  $p < .01$ . This inferred that older SNS users were associated with less negative experiences than their younger counterparts at T1, and at T2 associated with disclosing fewer types of information on their online profile. The age-related findings provided partial support for their being age differences in negative online experiences reported (RQ5, H5.1).

Table 5.1: Descriptive statistics and bivariate correlations ( $N = 175$ , Male = 84, Female = 91)

	Mean (SD)	$\alpha$	SNS Use		FOMO		Negative OE		Self-esteem		Network Size		Disclosure		Profile Data		Age
			T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1
1. SNS Use	T1 2.58 (1.48)	-		.56**	.43**	.37**	.33**	.28**	-.05	-.08	.25*	.18**	.41**	.27**	.37**	.25**	-.06
	T2 2.53 (1.47)	-			.32**	.37**	.18*	.23*	-.16	-.11	.21**	.21**	.30**	.35**	.24*	.30**	-.02
2. FOMO	T1 1.96 (.74)	.88				.55**	.38**	.31**	-.30**	-.20*	.37**	.29**	.25**	.27**	.23*	.19*	-.11
	T2 1.92 (.74)	.89					.24*	.27**	-.27**	-.34**	.18*	.18**	.24*	.34**	.13	.20*	-.13
3. Negative OE	T1 2.47 (1.10)	.91						.58**	-.19*	-.17	.37**	.29**	.22*	.12	.41**	.32**	-.16*
	T2 2.40 (1.03)	.91							-.26**	-.21*	.29**	.30**	.20*	.23*	.30**	.30**	-.12
4. Self-Esteem	T1 2.94 (.55)	.87								.59**	-.19*	-.20*	-.02	-.08	-.14	-.14	.11
	T2 2.98 (.60)	.90									.02	-.11	-.04	.02	-.02	.05	.11
5. Network Size	T1 414.48 (490.23)	-										.61**	.06	.13*	.48**	.36**	-.31**
	T2 438.88 (406.32)	-											.08	.18*	.36**	.43**	-.27**
6. Disclosure	T1 2.04 (.77)	.90												.51**	.22*	.11	-.03
	T2 2.03 (.78)	.91													.19*	.35**	-.03
7. Profile Data	T1 8.42 (3.37)	-														.60**	-.12
	T2 8.46 (3.29)	-															-.14*
8. Age	T1 20.51 (9.98)	-															
	T2 N/A	-															

df = 173; \*\* $p < .001$ ; \* $p < .01$  (one-tailed);  $\alpha$  = Cronbach's Alpha coefficient

#### *5.4.1.1 Testing for gender differences in the sample means*

An analysis of sample means differences for all main study variables (Table 5.1) was conducted to test for possible gender effects at the longitudinal time points (RQ5). Independent t-tests, using gender as the independent variable, are reported.

A significant effect of gender was found on profile data at T1,  $t(160) = 3.18, p = .002$ , such that females disclosed more types of profile information than males. Gender was also found to significantly influence self-esteem scores at both T1,  $t(160) = 3.34, p = .001$ , and T2,  $t(160) = 2.71, p = .008$ . At both time points, males exhibited higher mean levels of self-esteem than females. No other significant gender effects were evident,  $p > .05$ .

#### *5.4.1.2 Testing for differences in the sample means over time*

An analysis of sample means differences for all main study variables (Table 5.1) was conducted to test for possible longitudinal effects in the stability of the variables. Paired sample t-tests are reported. No significant differences in the T1 and T2 means were found for any of the main study variables,  $p > .05$ . This indicated that variables had stayed consistent over time.

#### *5.4.2 SEM analysis*

Latent constructs for the longitudinal analyses were based upon those defined in the cross-sectional analyses used in Chapter 4 (see Chapter 3 see Section 3.6.1.2, p.120, for details of CFA). Latent constructs for both time points were tested using CFA for all main study variables. All constructs were an acceptable fit to the data (Table 5.2) and required minimal covariance modification. Multi-group CFA, using time points

one and two as groups, was then used to test for invariance of latent constructs over time. Chi-squared difference tests between unconstrained and constrained models indicated that all latent constructs were invariant over time ( $p > .05$ ). This provided good grounds for conducting longitudinal SEM analyses.

*Table 5.2: Model fit over time for main latent constructs (N = 175, Male = 84, Female = 91)*

	T1					T2				
	$\chi^2$ (df, p)	CFI	TLI	SRM	RMSEA	$\chi^2$ (df, p)	CF	TL	SRM	RMSEA
				R	[95% CI]		I	I	R	[95% CI]
Negative OE	5.56 (4, .24)	1.00	.99	.02	.05 [.04, .05]	5.07 (3, .17)	.99	.99	.02	.06 [.05, .06]
FOMO	68.17 (32, .00)	.96	.94	.00	.08 [.07, .08]	65.64 (32, .00)	.97	.95	.00	.08 [.07, .08]
Disclosure	101.50 (52, .00)	.95	.94	.00	.07 [.07, .08]	112.20 (54, .00)	.95	.93	.00	.08 [.07, .08]
Self-Esteem	71.67 (34, .00)	.96	.95	.03	.08 [.07, .08]	81.65 (33, .00)	.96	.94	.03	.09 [.07, .09]

*CI = confidence interval*

A measurement model containing all longitudinal latent constructs (T1 and T2) was tested. The model was not a good fit to the data,  $\chi^2$  (2580) = 3960.11,  $p < .001$ , CFI = .84, TLI = .84, RMR = .03, RMSEA = .06 [.05, .06]. The number of distinct parameters estimated (196) in the model was more than the sample size, resulting in a sample to item ratio of 1: 0.8. Attempts to improve the fit of the model with item parcelling of all constructs reduced the number of parameter estimates to 74. However, this still did not provide an adequate sample to parameter ratio (1:2) and did not provide good model fit,  $\chi^2$  (277) = 546.56,  $p < .001$ , CFI = .92, TLI = .91, SRMR = .22, RMSEA =

.08 [.07, .08]. For this reason, simpler path estimated SEM models were implemented using mean variable totals calculated using the CFA defined latent constructs defined in Chapter 3 (see Chapter 3 see Section 3.6.1.2, p.120).

#### *5.4.2.1 SEM path modelling*

An autoregressive change model (Kenny, 2014) was implemented. This approach explored the mutually influencing role of psychological vulnerability (self-esteem), FOMO, SNS use, online connective behaviours, and negative online experiences over time (Figure 5.2). Error terms for the variables were covaried to control for existing relationships between the variables (i.e., between variables at T1). The model provided a means of testing all hypotheses simultaneously. The model tested was a good fit to the data,  $\chi^2 (14) = 12.51, p = .640$ ; CFI = 1.00; TLI = 1.00; RMSEA = .00 [.00, .04]; SRMR = .11. Bootstrapped 95% bias-corrected coefficients were calculated for each tested path. An overview of the results for each tested path is provided in Table 5.3. A graphical illustration of the significant coefficients is provided in Figure 5.2.



Table 5.3: Temporal path coefficients ( $N = 175$ , Male = 84, Female = 91)

Path	B [95%BCI]	$\beta$	S.E.	p (2-tailed)	p (1-tailed)
Age $\rightarrow$ Self-esteem T1	.012 [.001, .020]	.214	.085	.035	.018
Age $\rightarrow$ FOMO T1	-.003 [-.005, -.001]	-.180	.058	.002	.001
Age $\rightarrow$ SNS Use T1	-.015 [-.033, .009]	-.104	.070	.184	.092
Age $\rightarrow$ Network size T1	-.038 [-.057, -.015]	-.377	.115	.001	.001
Age $\rightarrow$ Self-disclosure T1	.000 [-.003, .002]	-.023	.068	.717	.359
Age $\rightarrow$ Profile data T1	-.074 [-.119, -.022]	-.218	.083	.005	.003
Age $\rightarrow$ Negative OE T1	-.027 [-.041, -.014]	-.244	.061	.001	.001
Gender $\rightarrow$ Self-esteem T1	-.341 [-.515, -.159]	-.314	.082	.001	.001
Gender $\rightarrow$ FOMO T1	.069 [.022, .115]	.223	.075	.003	.002
Gender $\rightarrow$ SNS Use T1	.452 [-.012, .903]	.153	.080	.054	.027
Gender $\rightarrow$ Network size T1	.403 [.122, .696]	.201	.073	.006	.003
Gender $\rightarrow$ Self-disclosure T1	-.008 [-.058, .040]	-.026	.079	.737	.369
Gender $\rightarrow$ Profile data T1	2.056 [1.024, 3.056]	.306	.073	.001	.001
Gender $\rightarrow$ Negative OE T1	.566 [.230, .891]	.259	.073	.001	.001
Self-esteem T1 $\rightarrow$ Self-Esteem T1	.659 [.489, .797]	.594	.074	.001	.001
Self-esteem T1 $\rightarrow$ FOMO T2	-.042 [-.078, -.002]	-.143	.066	.040	.020
Self-esteem T1 $\rightarrow$ SNS use T2	-.321 [-.653, .028]	-.119	.064	.075	.038
Self-esteem T1 $\rightarrow$ Network size T2	-.114 [-.290, .047]	-.056	.042	.165	.083
Self-esteem T1 $\rightarrow$ Self-disc T2	-.009 [-.044, .029]	-.031	.060	.622	.311
Self-esteem T1 $\rightarrow$ Profile data T2	-.260 [-1.101, .439]	-.043	.063	.459	.230
Self-esteem T1 $\rightarrow$ Negative OE T2	-.268 [-.475, -.041]	-.142	.060	.023	.012
FOMO T1 $\rightarrow$ FOMO T2	.452 [.285, .614]	.441	.080	.001	.001
FOMO T1 $\rightarrow$ Self-Esteem T2	-.067 [-.717, .586]	-.017	.086	.829	.415
FOMO $\rightarrow$ SNS use	.436 [-.984, 1.901]	.046	.078	.528	.264
FOMO $\rightarrow$ Network Size	.332 [-.590, 1.259]	.047	.066	.505	.253
FOMO $\rightarrow$ Self-disclosure	.151 [-.031, .332]	.141	.087	.106	.053
FOMO $\rightarrow$ Profile data	.014 [-3.056, 3.058]	.001	.073	.995	.498
FOMO $\rightarrow$ Negative OE	.099 [-.824, 1.102]	.015	.075	.833	.417
SNS use T1 $\rightarrow$ SNS use T2	.501 [.329, .660]	.506	.082	.001	.001
SNS use T1 $\rightarrow$ Self-Esteem T2	-.026 [-.086, .035]	-.064	.075	.400	.200
SNS use T1 $\rightarrow$ FOMO T2	.019 [.001, .036]	.174	.082	.039	.020
SNS use T1 $\rightarrow$ Network size T2	-.020 [-.121, .085]	-.027	.071	.684	.342
SNS use T1 $\rightarrow$ Self-disclosure T2	.001 [-.018, .020]	.008	.083	.912	.456
SNS use T1 $\rightarrow$ Profile data T2	.069 [-.229, .406]	.031	.073	.631	.316
SNS use T1 $\rightarrow$ Negative OE T2	.047 [-.051, .150]	.068	.074	.337	.169
Network size T1 $\rightarrow$ Network size T2	.689 [.471, .856]	.625	.096	.001	.001
Network size T1 $\rightarrow$ Self-Esteem T2	.073 [-.013, .164]	.122	.072	.095	.048
Network size T1 $\rightarrow$ FOMO T2	-.005 [-.029, .018]	-.033	.074	.618	.309
Network size T1 $\rightarrow$ SNS use T2	.089 [-.097, .275]	.011	.065	.326	.163
Network size T1 $\rightarrow$ Self-disc T2	.007 [-.018, .030]	.043	.074	.561	.281

Network size T1 → Profile data T2	.227 [-.276, .635]	.070	.072	.352	.176
Network size → Negative OE	.049 [-.079, .175]	.048	.062	.440	.220
Self-disclosure T1 → Self-disc T2	.500 [.310, .673]	.479	.088	.001	.001
Self-disclosure T1 → Self-Esteem T2	-.008 [-.511, .527]	-.002	.069	.972	.486
Self-disclosure T1 → FOMO T2	.070 [-.080, .233]	.069	.079	.336	.168
Self-disclosure T1 → SNS use T2	.844 [-.502, 2.193]	.092	.074	.222	.111
Self-disclosure T1 → Network size T2	.206 [-.639, 1.039]	.030	.062	.618	.309
Self-disclosure T1 → Profile data T2	-.786 [-4.061, 2.757]	-.038	.085	.698	.349
Self-disclosure → Negative OE	.317[-.650, 1.267]	.049	.077	.514	.257
Profile data T1 → Profile data T2	.527 [.373, .672]	.539	.072	.001	.001
Profile data T1 → Self-Esteem T2	.013 [-.016, .040]	.070	.080	.385	.193
Profile data T1 → FOMO T2	-.003 [-.010, .005]	-.061	.081	.517	.259
Profile data T1 → SNS use T2	.005 [-.064, .074]	.011	.082	.918	.459
Profile data T1 → Network size T2	.012 [-.028, .056]	.036	.066	.561	.281
Profile data T1 → Self-disc T2	.003 [-.005, .012]	.043	.088	.438	.219
Profile data → Negative OE	.005 [-.045, .053]	.016	.082	.827	.414
Negative OE T1 → Negative OE T2	.460 [.328, .588]	.491	.065	.001	.001
Negative OE T1 → Self-Esteem T2	-.056 [-.145, .030]	-.102	.082	.198	.099
Negative OE T1 → FOMO T2	.001 [-.022, .025]	.008	.081	.884	.442
Negative OE T1 → SNS use T2	-.106 [-.292, .081]	-.079	.070	.254	.127
Negative OE T1 → Network size T2	.012 [-.108, .128]	.011	.060	.828	.414
Negative OE T1 → Self-disc T2	-.014 [-.038, .008]	-.093	.078	.221	.111
Negative OE T1 → Profile data T2	.171 [-.245, .575]	.057	.068	.399	.200

*Gender coded as 0 (male) and 1 (Female); BCI = Bias corrected interval; OE = online*

*experiences*

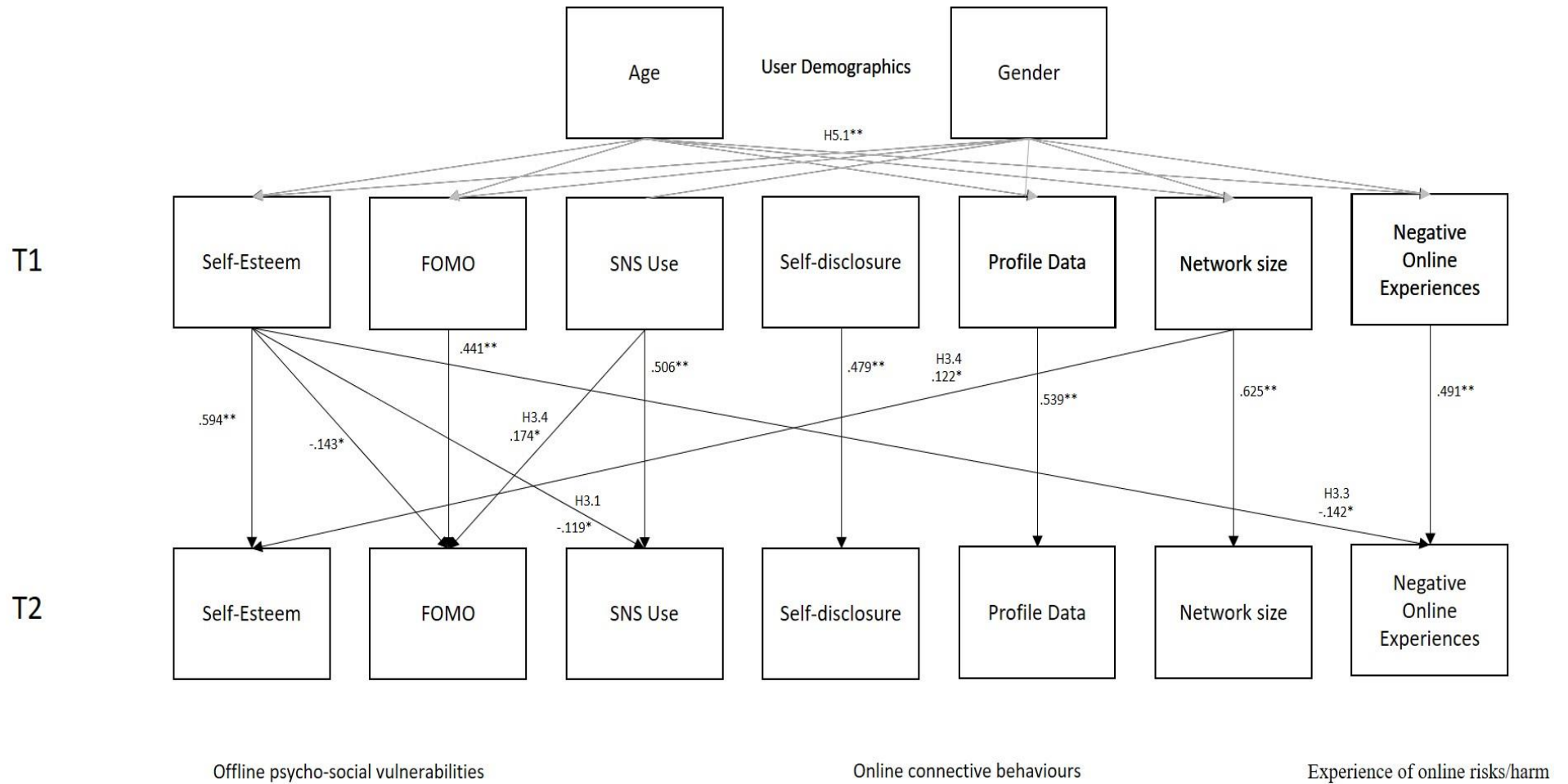


Figure 5.2: Temporal associations of main study variables (showing only significant paths). All relationships shown between age, gender and the T1 variables were significant to  $p < .05$ . Error terms at each time point were covaried to control for existing relationships between the variables. \*\* $p < .01$ ; \* $p < .05$  (one-tailed).

As expected from the initial comparison of sample means, all variables tested were significant predictors of themselves from T1 to T2,  $p < .01$ , indicating moderate stability for all variables. For instance, higher levels of SNS use at T1 was associated with higher levels of use at T2,  $\beta = .51$ ,  $p < .001$ . Complementing the findings from Chapter 4 (see Section 4.5, p.179), age and gender effects were demonstrated at T1. In terms of age, significant T1 effects were evident for self-esteem, FOMO, network size, profile data, and negative online experiences,  $p < .05$ . The direction of the coefficients suggested that younger SNS users were more likely to be psycho-socially vulnerable, have larger networks, disclose more profile data, and report higher levels of exposure to negative online experiences. For gender, significant T1 effects were evident for self-esteem, FOMO, SNS use, network size, profile data, and negative online experiences,  $p < .05$ . The direction of the coefficients suggested that female SNS users were more likely to be psycho-socially vulnerable, use SNS more, have larger networks, disclose more profile data, and report higher levels of exposure to negative online experiences than males. The age and gender results provided further support for age and gender related differences in negative online experiences (RQ5, H5.1).

Over and above the effects of age and gender, path coefficients between the main temporal variables showed partial support for H3.1. Lower levels of self-esteem at T1 were associated with higher levels of SNS use at T2,  $\beta = -.12$ ,  $p = .038$ . Partial support was also found for H3.3, with lower levels of self-esteem at T1 associated with higher levels of negative online experiences at T2,  $\beta = -.14$ ,  $p = .012$ . This indicated that individuals with offline psychological vulnerabilities at T1 might be more prone to not only use SNS more but also experience greater exposure to negative experiences online. FOMO at T1 did not significantly influence SNS use or exposure to negative

online experiences over time,  $p > .05$ . In contrast to the initial correlation analysis, no significant path support was found for H3.2, as no significant paths from self-esteem T1 or FOMO T1 were found with any of the connective behaviours at T2.

Partial support was also gained for H3.4. Significant paths between SNS use at T1 and FOMO at T2, and between network size at T1 and self-esteem at T2, suggested that higher levels of use and connective online behaviour might make an SNS user more psycho-socially vulnerable over time. No significant paths were evident for self-disclosure or profile data,  $p > .05$ . No path support was evident for H3.5. In the present analysis, SNS use and connective behaviours at T1 did not significantly influence the reported exposure to negative online experiences at T2. No support was found for H3.6, in that no significant paths were evident between negative online experiences at T1 and psycho-social vulnerability (self-esteem and/or FOMO) at T2,  $p > .05$ .

### *5.5 Discussion*

To date there has been a paucity in longitudinal analysis in SNS related research. While some studies have demonstrated associations between variables such as SNS use, psychological wellbeing and online risk, at times they have adopted a somewhat techno-deterministic approach to analysis (e.g., Frisson & Eggermont, 2016; Kross et al., 2013; Valkenburg et al., 2006). The longitudinal analysis presented in this chapter extends the cross-sectional analysis presented in Chapter 4 by exploring the temporal associations between offline psycho-social vulnerability, SNS use, connective behaviours, and negative online experiences. In doing so, the chapter considers potential reciprocal relationships between the variables to gain further insight into the motivations, behaviours and outcomes associated with SNS use.

The main findings can be summarised as follows. First, partial support for a negative relationship between offline psycho-social vulnerability at T1 and SNS use at T2 (H3.1) was evident over time, in that low levels of self-esteem at T1 was found to positively influence levels of SNS use at T2. Despite correlational support for an association between FOMO at T1 and SNS use at T2, no significant SEM based path was found. Second, correlational analysis supported a link between psycho-social vulnerability at T1 and online connective behaviours at T2 (H3.2). Positive associations between higher levels of FOMO at T1 and all connective behaviours at T2, and low levels of self-esteem at T1 and online friending (network size) at T2 were found. However, this was not supported in the SEM based path analysis. Third, complementing the cross-sectional results demonstrated in Chapter 4 (see Section 4.5, p.179), a potential longitudinal association between psycho-social vulnerability and negative online experiences was found (H3.3). Correlational analysis suggested a potential association between both self-esteem and FOMO at T1 and negative online experiences at T2, however, the SEM based analysis could only confirm support for a positive link between low levels of self-esteem and negative online experiences. Fourth, mixed support was also found for H3.4. Correlational and SEM based analysis indicated a positive association between SNS use at T1 and FOMO at T2. Despite correlational support for an association between network size and self-disclosure at T1 and FOMO at T2, the SEM analysis was non-significant. The SEM based analysis also indicated that network size at T1 was significantly associated with self-esteem at T2. Fifth, correlational support suggested associations between SNS use and connective behaviours at T1 and exposure to negative online experiences at T2 (H3.5), however, this was not supported by the SEM based analysis. Sixth, correlations suggested a positive link between negative online experiences at T1 and FOMO at T2 (H3.6).

However, no significant associations for either FOMO or self-esteem were indicated by the SEM based analysis. Finally, complementing the findings of Chapter 4 (see Section 4.5, p.179) support for RQ5, H5.1 was evidenced in that significant age and gender effects were present in the analysis, not least on the level of exposure to negative online experiences at T1.

The results described in this chapter have highlighted areas of both support and contradiction between the cross-sectional (Chapter 4) and longitudinal datasets (Chapter 5). The role of offline psycho-social vulnerability demonstrated in Chapter 4, was partially supported in the longitudinal analysis, largely by associations between self-esteem at T1, and its effect on SNS use and negative online experiences at T2. Such findings provided good grounds to suggest that an individual experiencing negative psycho-social thoughts might be more likely to engage in potentially problematic and risky SNS use. The role of FOMO, however, was much less prominent over time than was expected. In the cross-sectional analysis, and indeed the correlational longitudinal analysis, FOMO was significantly associated with most of the main study variables. However, the path analysis demonstrated that the reciprocal role of FOMO over time was not significant. While this might imply that FOMO, is a less important psycho-social indicator of online behaviours and consequences than previously thought, it is worth remembering that the cross-sectional role of FOMO was at times a product of complicated mediated relationships (see Section 4.5, p.179). Therefore, it could be that for the present sample the presence of FOMO, when considered in terms of the existing relationships it has with the other variables at each time point (controlled for in the SEM based analysis), might be a contributory factor to the importance of other variables at T1 over time (e.g., self-esteem) rather than a sole cause of a longitudinal outcome.

An original contribution of this chapter is that the longitudinal analysis demonstrates the cyclic nature of detrimental psycho-socially motivated SNS use as theorised previously by Przybylski et al. (2013). In doing so, it provides a useful and original longitudinal perspective of the relationship between psychosocial vulnerabilities and SNS use, furthering the cross-sectional findings presented in Chapter 4. Lower levels of self-esteem and higher levels of SNS use at T1 were associated with higher levels of FOMO, lower levels of self-esteem and higher levels of use at T2. FOMO theory (Przybylski et al., 2013) suggests that SNS users can unwittingly find themselves engaging in a cycle of use in which psychologically vulnerable users engaging with the site experience FOMO, and further detriments to their offline psychological vulnerability, leading SNS users to then attempt to boost their sense of wellbeing by further increasing their SNS use. Such a cycle, the beginning of which can be modelled from the present data, is likely to plunge the user into a spiral of behaviours which is unlikely to offer them the sense of control or social belonging they increasingly crave and which, without positive intervention or complete abstinence from the site they are unlikely to break. Furthermore, the significant association between self-esteem and negative online experiences at T2, suggests that this cycle of psycho-socially related behaviour might also over time have a potentially detrimental effect on the online experiences a SNS user might have. Further research of this cyclic effect with a larger and more representative sample across at least three-time points is recommended to determine the true extent to which such potentially debilitating online behaviour exists.

The association between connective online behaviours and negative online experiences was not found to be consistent over time. While correlational analysis suggested that all three forms of connective behaviour at T1 were associated with



higher levels of negative online experiences at T2, these associations did not hold in the path analysis. This was an unexpected finding in terms of the literature, however, inconsistencies in friending and disclosure effects were to be expected due to the level of sample attrition that had been experienced between data collection phases (see Chapter 3, Section 3.6.1.3.2.1, p.139). In addition, the mixed results in terms of connective online behaviours also serve to highlight the potential limitations of relying on self-reported estimates of digital behaviours. In common with previous literature (e.g., Ellison et al., 2007; Trepte & Reinecke, 2013), the self-reported survey approach implemented by this analysis has succeeded in providing estimates of the behavioural attributes of the users' networks. Whilst potential biases in these estimates can be controlled for in longitudinal analysis, since biasing factors will have a consistent effect over time, estimates still may not provide a fully representative depiction of an individual's online characteristics. For this reason, the collection and analysis of digital data with a stable and representative sample is recommended to further explore the impact of such behaviours on an individual's susceptibility to negative online experiences. This is explored further for network size (online friending) in Chapter 7.

To conclude, this present study provides significant self-reported support for the relationship between psycho-socially motivated SNS use, FOMO, and negative online experiences, and in so doing adds to the cross-sectional findings previously discussed in Chapter 4. Furthermore, in a field in which cross-sectional perspectives of online life dominate, the present longitudinal study provides a useful indication of the potential cyclic nature of psycho-socially vulnerable SNS use over time. While it is acknowledged that sampling limitations (see Chapter 3, Section 3.4.4, p. 112) might make these findings difficult to generalise to all SNS users, they do nevertheless, provide a good indication of the potentially negative effects that detrimental psycho-

social SNS use can have on an SNS user's subjective experiences. These findings carry implications for both offline and online interventions, in the form of information campaigns to make users aware of the potential warning signs of problematic cycles of SNS use and the ways in which engaging in online behaviours can render an individual vulnerable. However, for such interventions and information campaigns to be effective, an understanding of not just the characteristics of the SNS users, but also the way in which they perceive vulnerability is needed. To this end, chapter 6 considers SNS user self and third-person perceptions of vulnerability to negative online experiences.

## **Chapter 6: Perceptions of vulnerability to negative online experiences**

### *6.1 Chapter introduction*

The empirical findings discussed in the thesis thus far (Chapter 4 & 5) have highlighted ways in which psycho-socially motivated SNS use has the potential to influence an individual's reported rate of susceptibility to negative online experiences. Engagement in behaviours, such as disclosing personal data to a large network of connections, has the capacity to further influence this susceptibility. Despite frequent reports of SNS related risks and harms by academics and the popular press, some individuals continue to engage in potentially risky online behaviours. Research described in Chapter 2 (see Section 2.4.1.1, p.81), implied that continued engagement in such behaviours might be a result of misguided judgements by the SNS user. Chapter 6 will explore SNS users' perceptions of susceptibility to negative online experiences. In doing so this chapter will seek to further our understanding of why certain users might continue to engage in risky SNS behaviours.

### *6.2 Hypothesised model*

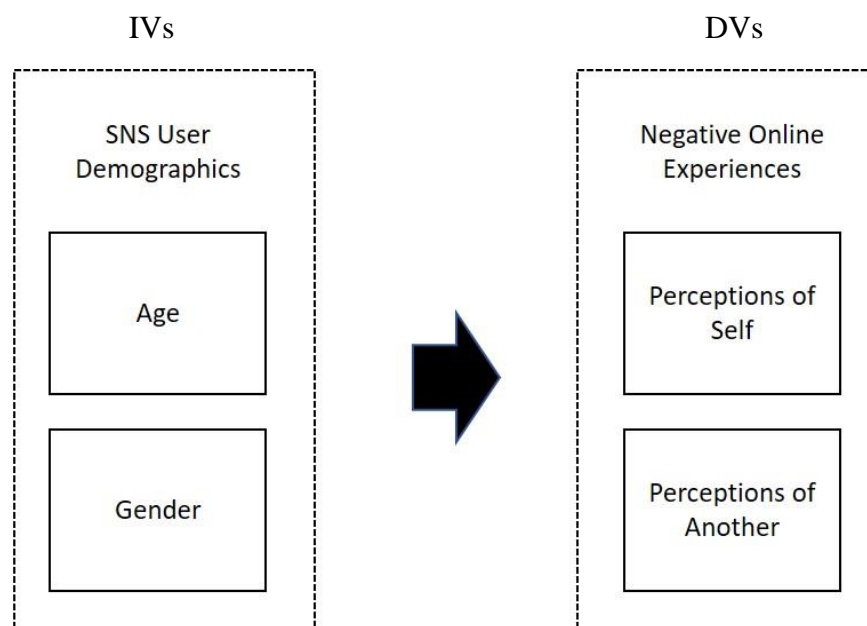
The research question in this chapter is:

*RQ5: Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?*

To address this question two hypotheses will be tested (see Figure 6.1):

*H5.2 The age and gender of SNS users will influence their reported self-perceptions of vulnerability to negative online experiences.*

*H5.3 The age and gender of SNS users will influence their reported third-person perceptions of vulnerability to negative online experiences.*



*Figure 6.1: Hypothesised model of the relationship between SNS user demographics and perceived vulnerability to negative online experiences (self and other).*

### *6.3 Theoretical context*

In the literature reviewed in Chapter 2, reasons for continued risky use of SNS platforms were discussed (see Section 2.4, p.79). The chapter highlighted an apparent ‘privacy paradox’ (Barnes, 2006), in which SNS users show concern for their online privacy/safety but still engage in risky online practices. Previous research has sought to explain the privacy paradox by inferring that lack of online skills and safety

awareness might be to blame (Debatin et al., 2009, Park, 2013). Termed cognitive deficiency theory, it is suggested that online users, concerned about their online privacy and safety, do not in fact know how to protect themselves adequately against such threats (Debatin et al., 2009). However, this might not always be the case, with research by Acquisti and Gross (2006), Krasnova et al. (2009), and Moreno et al. (2009), suggesting possession of such skills and awareness may do little to change an individual's actual behaviour. It would appear then, that even SNS users who are seemingly aware and concerned of the potential risks and harms that are associated with certain online behaviours, might continue to engage in risky online practices. Why might this be the case?

Research has suggested that the paradox might be the result of SNS users making behavioural judgements based on an analysis of SNS costs and rewards (Dinev & Hart, 2006; Draper, 2017). As highlighted in Chapter 1 (see Section 1.2.3, p.23), SNS can provide individuals with many benefits, including the ability to regulate psycho-social needs (e.g., by increasing one's sense of social connectivity and/or self-esteem). To some engaging in potentially risky online behaviours (e.g., self-disclosure of personal data) can present a means of satisfying such needs, for instance by offering opportunities to attract increased social capital. Therefore, for some SNS users, such behaviours present a necessary cost if they are to reap the perceived rewards of use.

Cost-reward judgements and subsequent online behaviours can be affected by whether an individual accurately perceives online risks and their potential severity (Chapter 2, Section 2.4.1, p.79). Some users may perceive risks to be apparent when in fact there are none, leading to a more 'fundamentalist' approach (Draper, 2017) to SNS use. Such judgements can lead to a misjudged hard-line approach to the online safety of themselves and others (e.g., their children), with some users restricting access and/or

information on the network. In contrast, some users might judge themselves to be not 'at risk' when the threat of susceptibility to negative online experiences is in fact high. This might lead to ill-judged open and 'unconcerned' (Draper, 2017) approaches to SNS use that may contribute to the potential risk and harm that they might experience on the network.

It has been suggested that these cost-reward judgements might be prone to optimistic bias. As previously discussed in Chapter 2 (p.83), optimistic bias theory states that individuals display a tendency to perceive negative events as less likely and positive events as more likely to happen to them (Higgins et al., 1997). Recent research by Cho, Lee, and Cheung (2010) suggested that online users show a tendency to perceive others to be more vulnerable to privacy and safety concerns than themselves. Such a comparison, termed 'comparative optimism' in the realms of risk perception research, has been attributed to a variety of factors including over-confidence (Weinstein, 1980), denial that the risk is present (Arnett, 2007), and a desire to protect one's own self-image (Helweg-Larsen, Sadeghian, & Webb, 2002).

### *6.3.1 Third-person effect*

Research has suggested that an individual's level of comparative optimism might be impacted by the third person effect (TPE, Davison, 1983). The TPE, as described previously in Chapter 2 (Section 2.4.1.1, p.81), is a theoretical framework, which suggests that individuals perceive mass communication media to have a greater effect on others than on themselves (Davison, 1983). In terms of SNS, the TPE is said to create a discrepancy in self-other perceptions in terms of the consequences of online behaviour, with individuals being more likely to attribute the negative effects of online

life to others (Debatin et al., 2009). The TPE has been previously evidenced in both adult and adolescent SNS users (Debatin et al., 2009; Paradise & Sullivan, 2012; Tsay-Vogel, 2015).

It has been suggested that the TPE is more pronounced when individuals feel demographically distanced from the ‘others’ in question (Gunther, 1991). Traditionally, age and gender have provided such demographic distances. For example, in terms of age, adults often regard themselves as being more risk adverse than their younger counterparts due to the increased level of life experience and education that they have accrued (Tiedge, Silverblatt, Havice, & Rosenfield, 1991). The distance in age has been shown to inflate an adult’s perception of a young person’s vulnerability, and conversely a young person’s perception of an adult’s apparent ability to navigate the risk successfully, in a variety of contexts such as road safety (Carver, Timperio, & Crawford, 2008), television viewing (Hoffner & Buchanan, 2002), and ‘stranger danger’ (Fessler, Holbrook, Pollack, & Hahn-Holbrook, 2014; Foster, Villanueva, Wood, Christian, & Giles-Corti, 2014). It has been suggested that this somewhat skewed approach to evaluating self-other vulnerabilities is exacerbated by the often sensationalised ‘media panic’ that surrounds people’s digital lives (Draper, 2012).

Age-related perceptions of vulnerability are commonplace in the realms of SNS. From a media driven perspective, the public are persistently bombarded with messages about the potential perils of young people engaging with online platforms. Anecdotal articles in the popular press (The Telegraph, 2016), television programmes (Cyberbully, 2015), and even videos uploaded on popular platforms such as BBC iPlayer (CBBC LifeBabble, 2016) consistently attribute online vulnerability to young SNS users, a notion that is seemingly supported by the plethora of academic research focussing on

the risks encountered by the young (Dredge et al., 2014; Kwan & Skoric, 2013; Livingstone & Helsper, 2013; Livingstone et al., 2013).

Recent research indicates that in an increasingly complex digital landscape young people may benefit from a parent, or other significant adult, providing support to help mitigate potential risks of online engagement (Livingstone et al., 2017). Highlighting the role of an adult as a source of guidance and experience, such approaches, while sensible in an online context, serve to emphasise perceived demographic distances in digital users. As such, it is plausible that adults and young people might perceive their level of vulnerability to risk differently due to the apparent influence of their demographic distance in age and perceived experience.

In terms of gender, risk perception literature suggest that males have a tendency to perceive risks at a lower level than females (for example, Finucane & Satterfield, 2002; Gutteling & Wiegman, 1993). Recent research has suggested that this trend is apparent in online domains such as online shopping (Garbarino & Strahilevitz, 2004) and internet privacy (Bartel-Sheehan, 1999; Kehoe & Pitkow, 1997). Reasons posited for a gender gap in risk perceptions include biological and social differences. Traditionally women have been said to be more concerned about safety due to their maternal tendencies and apparent physical vulnerability when compared to men (Flynn, Slovic, & Mertz, 1994), suggesting that they may be more sensitive to apparent risks. Furthermore, research into SNS, the present thesis included (see Chapter 4, Section 4.5.1.2, p.183), has demonstrated an apparent difference in terms of the reporting of negative online experiences, indicating that females might be more prone to more problematic encounters online (Jones et al., 2013; Staksrud et al., 2013).



Risk perception studies have been criticised for not controlling for factors such as online usage rates and prior experience of a negative events (Garbarino & Strahilevitz, 2004). The present thesis will control for such variables, and additionally for an SNS user's psycho-social motivations and online behaviours, to ensure potential confounding variables are accounted for when considering the role of demographic distances on perceptions of vulnerability. This chapter therefore, investigates the extent to which demographic distances (e.g., in age and gender) might impact on a SNS user's perceptions of the risk of being exposed to negative online experiences (H5.2, H5.3). Using a TPE approach, the chapter explores potential instances of comparative optimism between self-other ratings of SNS vulnerability to negative online experiences. In doing so, the chapter provides consideration of why some individuals report perceptions of relative risk when engaging in risky online practices on SNS.

#### *6.4 Method*

The data presented in this chapter are derived from the online self-report survey previously reported in Chapters 4 and 5. Measures of personal perceptions of vulnerability (PPV) and third person vulnerability (TPV) to negative online experiences are reported. In the context of this study, the rating of TPV is attributed to the vulnerability of an unrelated adolescent user (see Chapter 3, p.132) for an overview). This approach has been adopted to capture potential age-related disparities in perceptions of online vulnerability to negative online experiences as hypothesised in H5.2 and H5.3. A comprehensive overview of the data collection methods, measures, and sample characteristics is described in Chapter 3 (see Section 3.6.1, p.117).

## 6.5 Results

The results for this chapter are presented from two perspectives. Firstly, a cross-sectional analysis of group differences in perceptions of PPV and TPV, where users were asked to rate the perceived vulnerability to negative online experiences of the self and of an unknown adolescent Facebook user. This is followed by a longitudinal analysis to test whether the perceptions of vulnerability to negative online experiences are consistent over time.

### 6.5.1 Factors associated with vulnerability perception

Descriptive statistics for the full sample and by age-group are provided in Table 6.1. The first wave of the data collection was completed by 506 UK based Facebook users, aged between 13 and 77 years old (*Mean Age* = 20 years 7 months; *SD* = 9 years 10 months; 53% male). Seventeen participants were removed from the analysis due to missing data, producing a final sample size of 489 (see chapter 3, p.135 for further details).

*Table 6.1: Descriptive statistics for the main study variables (N = 489; female = 242, male = 247)*

	Cronbach's $\alpha$	Mean (SD)
Age	-	20.88 (10.12)
Self-Esteem	.88	2.95 (.56)
FOMO	.88	1.99 (.78)
SNS Use	-	2.54 (1.48)
Network size	-	424.28 (419.46)
Profile data	-	8.48 (3.46)
Self-disclosure	.88	2.00 (.79)
Negative OE	.91	2.52 (1.09)
PPV	.94	2.44 (1.27)
TPV	.93	2.95 (1.15)

*Adolescents = 297, Emerging Adults = 97, Adults = 125*

Bivariate correlations ( $d.f. = 487$ ) of the full sample showed a moderate association between PPV and TPV scores,  $r = .426, p < .001$ , in that higher levels of reported PPV were associated with higher levels of TPV. Significant correlations were present between age and both PPV,  $r = -.244, p < .001$ , and TPV,  $r = .164, p < .001$ , in that being an older participant appeared to be associated with reporting lower levels of personal perceptions and higher third person perceptions of vulnerability to negative online experiences. In terms of psycho-social vulnerability, correlational results were mixed. No significant associations were found between PPV, TPV, and self-esteem,  $p > .05$ , however, both PPV,  $r = .220, p < .001$ , and TPV,  $r = .190, p < .001$ , were significantly associated with FOMO. Higher levels of PPV and TPV were associated with higher levels of FOMO. A positive association was also evident between TPV and SNS use,  $r = .146, p < .001$ , in that higher levels of TPV was associated with

higher levels of SNS use. PPV was not significantly associated with SNS use,  $p > .05$ . In terms of connective behaviours, only self-disclosure was associated with PPV,  $r = .117$ ,  $p = .005$ , and TPV,  $r = .131$ ,  $p = .002$ . Higher levels of PPV and TPV were associated with higher levels of self-disclosure. No other connective behaviours were significantly associated with PPV or TPV,  $p > .05$ . Reported exposure to negative online experiences was associated with PPV,  $r = .108$ ,  $p = .008$ , in that higher levels of prior exposure were associated with higher levels of perceived susceptibility to online vulnerability. Prior exposure to negative online experiences was not associated with TPV,  $p > .05$ .

#### *6.5.2 Testing the TPE*

The TPE was tested using analysis methods based on those presented in Price, Huang, and Tewkesbury (1997). To test the extent to which participants displayed the TPE when considering perceptions of vulnerability towards negative online experiences, a TPE differential score was created by subtracting PPV scores from TPV scores. In line with research into comparative optimism (Joshi & Carter, 2013; Klein & Helweg-Larsen, 2002), the TPE differential score reflected the differences in the perceived likelihood of an adolescent other experiencing negative online experiences when compared to the perceptions of the self-experiencing negative online experiences. Positive scores were indicative of higher levels of optimism that the self would not experience negative online experiences. Negative scores were indicative of the self being perceived more likely to experience negative online experiences than an adolescent other. Scores close to zero were indicative of a perceptually neutral stance on the susceptibility of self and an adolescent other to negative online experiences (Joshi & Carter, 2013).

For the overall sample, the mean TPE differential score was .51 ( $SD = 1.30$ ), indicating that on average the sample perceived themselves to be less likely to encounter negative online experiences than an adolescent other. Bivariate associations with the main study variables indicated that the TPE differential score was significantly associated with age,  $r = .384$ ,  $p < .001$ , and network size,  $r = -.111$ ,  $p = .007$ . Older participants and those with fewer online connections were associated with lower levels of negative online experiences, therefore displaying the TPE.

To test the extent to which the main study variables might influence the TPE, a hierarchical regression analysis was conducted in SPSS with the TPE differential as the outcome variable. Age was entered in step one of the regression, gender in step two, and all remaining main study variables in step three. The addition of age in step one contributed significantly to the model,  $F(1, 487) = 84.30$ ,  $p < .001$ , accounting for 15% of the variation in TPE,  $R^2 = .15$ . Adding gender to the model in step two, explained an additional 1% in the variation in TPE scores, this change in  $R^2$  (.01) was significant,  $F\Delta(1, 486) = 7.49$ ,  $p = .006$ . The addition of the remaining main study variables at step three did not add significantly to the model,  $R^2\Delta = .01$ ,  $F\Delta(1, 479) = .80$ ,  $p > .05$ . The significance of age,  $\beta = .34$ ,  $p < .001$ , and gender,  $\beta = .12$ ,  $p = .008$ , in the regression model provided support for H5.3. Larger third person effects were predicted by participants being older and female.

To determine the precise ways in which the main study variables influenced the TPE, two further regression analyses were conducted on the PPV and TPV variables. The regression model for PPV,  $F(9, 479) = 6.87$ ,  $p < .001$ ,  $R^2 = .11$ , provided partial support for H5.2. It indicated that age,  $\beta = -5.05$ ,  $p < .001$ , and FOMO,  $\beta = .12$ ,  $p = .008$ , were significant predictors of an SNS user's personal perception of vulnerability to negative online experiences. Gender was not a significant predictor of PPV,  $p > .05$ .

Higher levels of PPV were predicted for SNS users who were younger and those with higher levels of FOMO. In support of H5.3, the regression model for TPV,  $F(9, 479) = 5.96, p < .001, R^2 = .10$ , indicated that age,  $\beta = .12, p = .015$ , gender,  $\beta = .10, p = .041$ , FOMO,  $\beta = .16, p < .001$ , and network size,  $\beta = -.13, p = .009$ , were significant predictors of an SNS user's perception of the vulnerability of a third person (an unknown adolescent). Higher TPV scores were predicted for SNS users who were older, female, higher in FOMO, and those with smaller network sizes.

#### *6.5.2.1 Testing the role of age-group on the TPE*

Given the significance of age as an influencer of perceptions of vulnerability, a comparison of the three sample panels was made to test the extent to which the different age groups sampled in the research might experience the TPE (RQ 5, H5.1 and H5.2). The sample was split into three age-groups, adolescents (aged 13-17 years;  $M = -.02, SD = 1.16$ ), emerging adults (aged 18 – 21 years;  $M = .77, SD = 1.02$ ), and adults (aged 22+ years;  $M = 1.41, SD = 1.21$ ). A 3x2 independent factorial ANCOVA (Age-group [adolescent (1), emerging adult (2), adult (3)] X Gender [male (0), female (1)]) was performed on the TPE differential. Age-group and gender were entered as the independent variables. All main study variables were entered as covariates in the model, this served to reduce the variance in the error terms and provide more precise measurement of the treatment effects. A significant effect of age-group was found,  $F(2, 475) = 17.66, p < .001$ , partial  $\eta^2 = .07$ . Gender was not significant in the age-group model,  $p > .05$ , nor was the interaction between age-group and gender,  $p > .05$ . Bonferroni comparisons of the adjusted TPE differential means indicated that significant differences were evident between the age-groups,  $p < .05$ . Adolescents (Adjusted  $M = -.02 [-.21, .18], SE = .10$ ) demonstrated significantly lower TPE

differentials than both emerging adults (Adjusted  $M = .79$  [.43, 1.14],  $SE = .19$ ,  $p < .001$ ), and adults (Adjusted  $M = 1.27$  [.912, 1.62],  $SE = .18$ ,  $p < .001$ ). No significant difference was found in the means scores for the adult and emerging adult TPE differentials,  $p > .05$ . The results of the ANCOVA indicated that adolescents were less prone to the effects of the TPE than both emerging adults and adults, see Figure 6.2. The adjusted mean score of near zero suggested that adolescents held a more neutral stance in terms of the TPE, not really believing themselves to be any more or any less susceptible to negative experiences than the adolescent other presented in the vignette. In contrast, both emerging adults and adults were more likely to perceive themselves to be significantly less likely to experience negative online experiences than the ‘teenage other’.

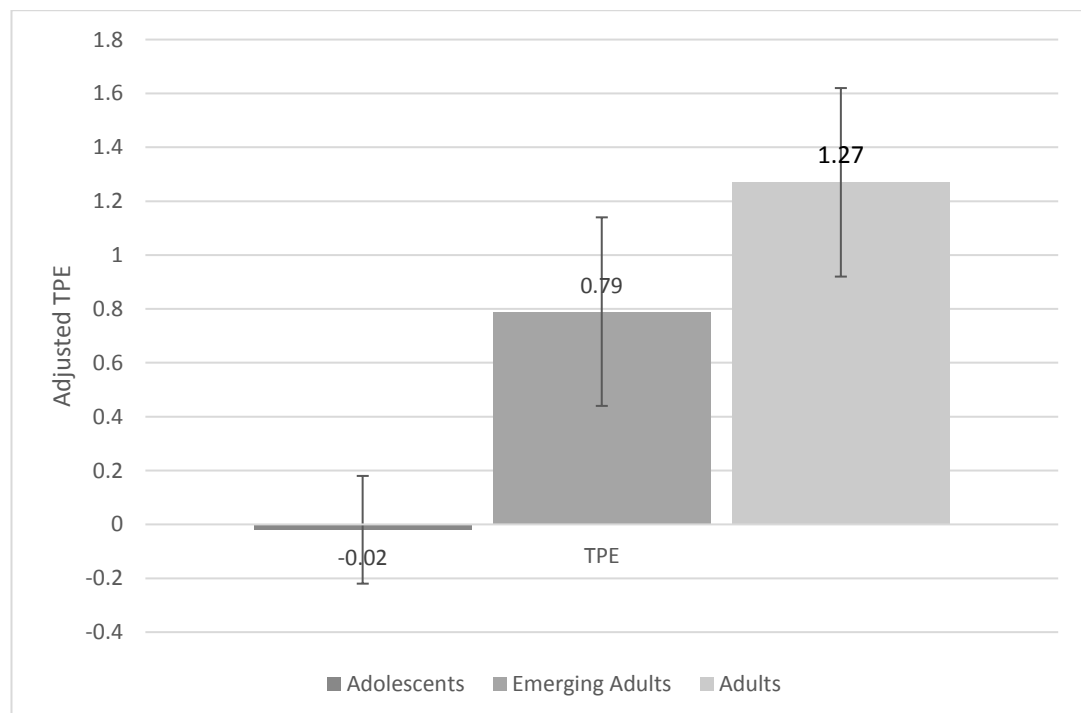


Figure 6.2: Mean TPE differential scores for each age group ( $N = 489$ , Adolescents = 297, Emerging Adults = 97, Adults = 125)

#### 6.5.2.2 Longitudinal stability of the TPE

The stability of the TPE was tested over three-time points over a period of 12 months. A total of 97 participants (*Mean Age* = 21 years 4 months (*SD* = 10 years 4 months), 56% female) completed the survey at all three-time points. Seven participants were removed from the analysis due to missing data (> 20%). Sample attrition and missing data procedures for the three-phase longitudinal sample are discussed in detail in Chapter 3 (see Section 3.6.1.3.3, p.142). Descriptive statistics for the longitudinal sample over the three time points can be found in Table 6.2.

*Table 6.2: Descriptive statistics for the longitudinal sample (N = 90; Male = 43; Female = 54)*

	T1		T2		T3	
	<i>Mean</i>	$\alpha$	<i>Mean</i>	$\alpha$	<i>Mean</i>	$\alpha$
	( <i>SD</i> )		( <i>SD</i> )		( <i>SD</i> )	
PPV	2.68 (1.33)	.91	2.43 (1.23)	.94	2.46 (1.27)	.96
TPV	3.31 (1.09)	.91	3.17 (1.10)	.93	3.18 (1.14)	.94
TPE Differential	.51 (1.31)		.48 (1.15)		.56 (1.23)	

$\alpha$  = Cronbach's Alpha; Adolescents = 38, Emerging Adults = 22, Adults = 30

Bivariate partial correlations were calculated for PPV, TPV, and the TPE differential across all three-time points (Table 6.3). PPV, TPV, and TPE differential scores were significantly correlated with themselves across all three-time points ( $p < .01$ ), demonstrating consistency in the measures over time. Furthermore, at all three-time points increases in PPV scores were positively associated with increases in TPV scores ( $p < .01$ ).



Table 6.3: Correlations for the longitudinal sample ( $N = 90$ ; Male = 43; Female = 54)

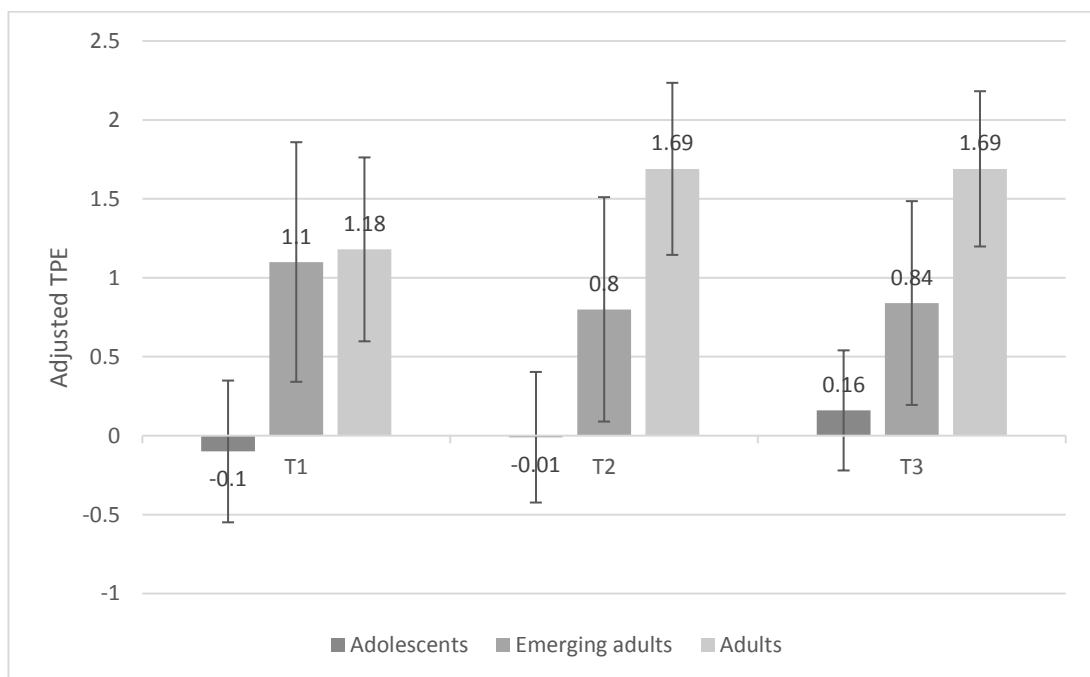
	1	2	3	4	5	6	7	8	9
1. PPV T1		.66**	.60**	.47**	.35**	.44**	-.65**	-.36**	-.24**
2. PPV T2			.57**	.34**	.50**	.45**	-.40**	-.58**	-.21**
3. PPV T3				.31*	.23*	.57**	-.36**	-.36**	-.55**
4. TPV T1					.41**	.52**	.38**	.06	.20*
5. TPV T2						.43**	-.01	.42**	.17
6. TPV T3							-.02	-.06	.37**
7. TPE T1								.43**	.43**
6. TPE T2									.38**
9. TPE T3									

*d.f.* = 88; \*\* $p < .001$ ; \* $p < .01$ ; TPE = TPE differential score; Adolescents = 38, Emerging Adults = 22, Adults = 30

To test the stability of the TPE over time for each age group, a TPE differential score was calculated for each time point. A mixed factorial 3x3x2 ANCOVA (Time-point [1, 2, 3] X Age-group [adolescent (1), emerging adult (2), adult (3)] X gender [male (0), female (1)]) was performed with the TPE differential as the dependent variable. Time was repeated measures. All remaining main study variables were entered as covariates in the model, this served to reduce the variance in the error terms and provide more precise measurement of the treatment effects. There was no significant effect of time-point on the TPE,  $p > .05$ . This indicated that the TPE scores for the three-wave sample were consistent across time.

As before a significant between-subject effect of age-group was evident,  $F(2, 77) = 21.02$ ,  $p < .001$ , partial  $\eta^2 = .37$ . Bonferroni comparisons of the adjusted means indicated that adolescents had significantly lower TPE differentials than adults at all

three-time points ( $p < .001$ ). There was no significant overall longitudinal difference between emerging adult and adult TPE scores,  $p > .05$ . In contrast to the larger sample cross-sectional study, there were no significant mean differences evident between the adolescents and emerging adults,  $p > .05$ , at any time point. The non-significant findings could in part be due to reduced power from the smaller sample size. It should be noted that despite the differences in significance values, the pattern of results demonstrated with the smaller three-wave sample complimented the results from the larger cross-sectional sample outlined in Section 6.5.2.1 (p.229). This indicated that the pattern of TPE differences between the age-groups remained largely stable over time (see Figure 6.3).



*Figure 6.3: Mean TPE differentials for the three age-groups over time (N = 90; Adolescents = 38, Emerging Adults = 22, Adults = 30)*

## *6.6 Discussion*

The present analysis sought to explore Facebook users' perceptions of online vulnerability. Using multivariate analysis of cross-sectional and longitudinal self-reported datasets, the results provide an insight into the way in which age and gender can impact on an individual's perceptions of self-other vulnerability towards negative online experiences. First, partial support for demographic differences in self-perceptions of vulnerability (H5.2) was found. Older participants showed a tendency to rate themselves significantly lower in PPV than younger participants. This was supported in correlational and regression analyses. No significant effect of gender was evident on PPV scores. However, regression analyses did indicate that FOMO (entered as a control) was found to be a significant predictor of PPV. This indicated a potential association between higher levels of FOMO and higher levels of PPV. Second, support was gained for demographic effects on third person perceptions of vulnerability towards a fictional adolescent third person (H5.3). Regression analysis showed that both age and gender were significant predictors of TPV scores, in that older and female SNS users were associated with higher levels of the initial third person ratings towards the fictional adolescent user. Having higher levels of FOMO and a smaller network size was also found to be significant. When considering the TPE differential, a measure of third person comparative optimism, the results also demonstrated the role of age and gender. However, it was apparent that age provided significantly more statistical explanation of the TPE. Further analysis, of age-related differences in TPE differential scores indicated that when considered by age group, adults and emerging adults (i.e., university students) displayed significantly larger TPE differentials than adolescents. Participants over the age of 18 displayed significantly higher levels of optimism that they were less likely to experience negative online experiences than the

fictional adolescent user presented to them in the vignette. In contrast, adolescents rated themselves to be similarly as vulnerable to potential risks as the fictional adolescent user, displaying a TPE differential score close to zero. These findings were largely consistent over time.

The association between PPV and age indicated that self-perceptions of vulnerability to online negative experiences were likely to be decided by age. Older SNS users were associated with lower levels of PPV, and younger users with higher levels. This finding complements the evidence previously presented in this thesis (see Chapter 4, Section 4.5, p. 179) of age-related differences in reported encounters in negative online experiences. Associations were previously found between younger users and females, and higher levels of negative online experiences. The parity demonstrated between experience and personal perception suggests that SNS users might have well-founded reasons for perceiving online risks in the manner demonstrated in this research. It may be, for instance, that older user's perceptions of personal risk were lower due to them experiencing less negative online experiences. However, that is not to say that older users should deem themselves to be risk averse. As previously demonstrated in Chapter 4, an individual's level of FOMO, SNS use, and self-disclosure, all factors shown to contribute to potential susceptibility to negative online experiences, are not necessarily age-dependent. It is therefore, little surprise that FOMO was found to be a significant determinant in whether individuals perceived themselves to be at risk in this study.

In terms of the higher levels of risk perception reported by adolescents, it would indicate that adolescent's users might be quite effective at estimating their own likelihood of encountering potential risks on SNS. A possible explanation for this, aside from their own experience of such encounters, could be that younger users are

more sensitive to the personal risks of SNS use due to the frequency of information, that they receive regarding their online safety and the potential hazards on interacting with others online (for example, NSPCC, 2016; Safer Internet, 2016; Thinkuknow, 2016). However, despite their apparent heightened perceptions, it has been suggested that an adolescent's actual online behaviour may not always be conducive with countering such perceptions or indeed the e-safety recommendations that have been provided to them (Vanderhoven et al., 2013) with risky online behaviours regarded as normative in some adolescent circles (Moreno et al., 2009). Despite the efforts of current internet and SNS interventions, countering an 'informed' adolescent's online risk behaviour might be equally problematic as offering advice to an adult who deems themselves to be risk averse.

Theories of behavioural change suggest that increasing awareness and understanding of the risks that an individual might incur may serve to alter their behaviours. For instance, the Theory of Planned Behaviour by Ajzen (1991), states that an individual's behaviour is dependent on their intentions. In this way, individuals draw upon their attitudes and beliefs about a behaviour prior to engaging in the behaviour. In the context of SNS, such attitudes and beliefs are often linked to an individual's appraisal of the costs-rewards associated with risky online practices. Therefore, if a SNS user feels that the reward associated with their behaviour is likely to outweigh the potential cost, they are unlikely to refrain from engaging in the potentially risky online behaviour. Prochaska et al. (1998) suggest that raising awareness about not only what the risks are but also how they are linked to specific behaviours, might provide an effective means of promoting effective behavioural change. Considering the present research, this suggests that raising awareness of specific FOMO related SNS

behaviours and their implications might be a useful means of promoting safer user practices across different ages and genders.

The TPE results presented in this chapter provide support for previous research that has suggested that SNS users are prone to apportioning the negative consequences of SNS engagement onto others more readily than themselves (Debatin et al., 2009; Paradise & Sullivan, 2012). However, the present thesis highlights that these perceptions are likely to be affected by the age and gender of the SNS user, suggesting that as theorised by Gunther (1991), demographic distance might play a role in determining an individual's perceptions of online risk.

The use of the vignette of a 'typical' teenage user: a fourteen-year-old Facebook user named Alex (see Chapter 3, p.132) appears to have played to adult and emerging adult perceptions of adolescent online risk. For the adults, rating the vulnerability of an adolescent user is likely to have been influenced by the age difference between themselves and the adolescent character (Gunther, 1991), complementing previous research into age-related risk perceptions in the offline world (Carver et al., 2008; Hoffner & Buchanan, 2002). In contrast, the near zero TPE differentials displayed by the adolescent SNS users, offer an interesting insight. While, TPE theory suggests that all users should demonstrate the effect when rating another person, the near zero differential indicates that, in line with Gunther's (1991) theory, small demographic distances might serve to lessen the effect. For the adolescents, the fictional adolescent vignette presented them with an opportunity to rate the vulnerability of someone who was more likely to be their peer and therefore more likely to exhibit similar online traits.

The consistent perceptions of higher levels of adolescent vulnerability (towards self and other) displayed by the adolescents, in addition to the higher perceived rating adult ratings of adolescent vulnerability, provides evidence to counter to the media panic debate (Draper, 2012). It could be that both adults and adolescents estimate risk for adolescents (themselves and others) as higher than that for adults because it is higher, and not because adults are not aware of the risks they run. This would support the findings of the previous empirical chapters (Chapters 4 and 5) in which younger users exhibited higher levels of psycho-socially motivated online behaviours.

In terms of the small, yet significant, contribution of gender on both the raw TPV scores and the TPE differentials, the findings support previous risk perception research which has suggested that females are more prone to estimate risk in others more highly than men (Finucane & Satterfield, 2002). In the context of this research, it could be that the rating of a fictional adolescent user might have triggered potential biological or societal instincts. To test the reasons for this gender difference in perception further research is recommended, as self-report survey methods alone do not provide adequate opportunity to reflect on the motivations and/experiences guiding such a response.

A limitation of the present research is in the use of the single vignette to test the TPE effect (see Chapter 3, p.134 for a discussion of the limitations with regards to the choice of vignette). In using a short scenario based on a fictional gender-neutral adolescent user, it has not been possible to test whether this effect is consistent when rating differently aged and gendered others. To fully explore the role of age and gender in the TPE, a wider array of vignettes allowing people to rate multiple others is recommended. Furthermore, this would allow for testing of an adolescent to adult perspective, rather than just the adult to adolescent perspective tested in this thesis.

Another potential limitation of the research is related to the order of the questions presented in the survey. Personal perceptions were rated first and the perceptions towards the fictional adolescent second. As such the ordering may have inadvertently impacted on the participant responses, as they had already been primed to consider their own vulnerability. A randomised approach to presenting the scales would have prevented such potential bias from occurring.

In conclusion, while the results of the present chapter are not generalisable to the entire SNS community (see Chapter 3, Section 3.4.4, p.112 for a critique of the sampling procedure), they do show that age and gender play a role in determining the extent to which an SNS user perceives themselves and others (a fictional adolescent user) to be susceptible to negative online experiences. The findings also demonstrate the role of FOMO, furthering our understanding of the role that this psycho-social vulnerability can play in both an individual's exposure and perception of negative online vulnerability. SNS can provide users, young and old alike, with a host of psycho-social benefits; however, they are not without potential risks. The findings of this study suggest that there is currently a demographic divide in perceptions of vulnerability that while seemingly reflective of SNS user's offline and online experiences, may need to be bridged. As the digital audience continues to increase with age it would be foolhardy to assume that life experience alone is enough to prevent susceptibility to the ever-evolving and increasingly complex digital risks and vulnerabilities associated with online life. A greater understanding of how specific online behaviours might influence a SNS user's perceptions and exposure to negative online experiences is needed to provide an evidence base from which to establish future safety awareness information and interventions. The remaining empirical chapters will focus on one such behaviour in more depth: online friending.



## **Chapter 7: Online friending: The impact of network size and diversity on vulnerability to negative online experiences.**

### *7.1 Chapter introduction*

The empirical chapters thus far have considered factors that could influence an individual's perceptions and reported experience of vulnerability to negative online experiences. Chapter 7 provides further in-depth consideration of one such factor, online friending. In Chapters 4, 5, and 6, online friending (i.e., network size) was presented as an example of a connective behaviour that, along with self-disclosure, may contribute to a user's perception and exposure to negative online experiences. For instance, in Chapter 4 (see Section 4.5, p.179) larger network sizes were associated with higher reported levels of exposure to negative online experiences when combined with frequent SNS engagement and FOMO.

In common with previous research which has sought to find associations between SNS use and negative online experiences (Binder et al., 2012; Fogel & Nehmad, 2009), the analyses presented in the previous chapters relied on self-report measures alone. While this is the norm for obtaining responses to psychological scales, self-reported estimates of large scale online network characteristics are potentially prone to estimation biases (e.g., network size; Bell et al., 2007) and in some cases, may be impossible to attain accurately.

Technological advances in data collection methods (Hogan, 2008; Rieder, 2013) now render it possible for psychologists and other researchers in non-technical disciplines to overcome this potential for bias by combining self-reported data with a user's actual digital characteristics. Furthermore, a precedent has been set for digitally derived psychological analysis with a recent study exploring social support mechanisms

(Brooks et al., 2014). This chapter will look at how such data can provide an in-depth exploration of online vulnerability to negative online experiences that goes beyond the readily available metrics of traditional psychological research. Specifically, the chapter will re-consider the potential role of a specific connective behaviour, online friending, and its association with negative online experiences using a combination of both self-reported measures and digitally derived network data. In doing so the chapter will extend the notion of online friending previously reported in thesis (i.e., via network size) to consider the potential impact of the diversity and structural composition of the social capital available on the network.

It should be noted that sections of the introduction, analyses, and discussion presented in Chapter 7 are partly presented in/based on an article published in an academic journal (Buglass et al., 2016, see Appendix 9 for further details).

## *7.2 Hypothesised model*

Higher levels of SNS engagement have been associated with larger online social network sizes (Madden et al., 2013), raising concerns about the consequences of accumulating a diverse array of social capital online (Manago et al., 2012), and about data privacy (Debatin et al., 2009). Why should this be the case? In the following, a set of processes that link both network size and social network diversity (e.g., in terms of both the self-reported social capital and the digitally derived structure of the network) to an individual's potential vulnerability to negative online experiences are outlined.

The research questions to be addressed in this chapter are:

*RQ4: Does the accumulation of large, diverse online networks influence the reported rate of negative experiences online?*

*RQ5: Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?*

To address these questions six hypotheses will be tested using a multiple mediation model (see Figure 7.1):

*H4.1 Digitally reported network size will positively predict exposure to negative online experiences.*

*H4.2 Diversity of social capital will positively predict exposure to negative online experiences.*

*H4.3 Diversity in the digitally derived structure of SNS will positively predict exposure to negative online experiences.*

*H4.4 Diversity in the online network (social and structural) will mediate the relationship between digitally reported network size and exposure to negative online experiences.*

*H5.1 The age and gender of SNS users will influence the reported level of exposure to negative online experiences.*

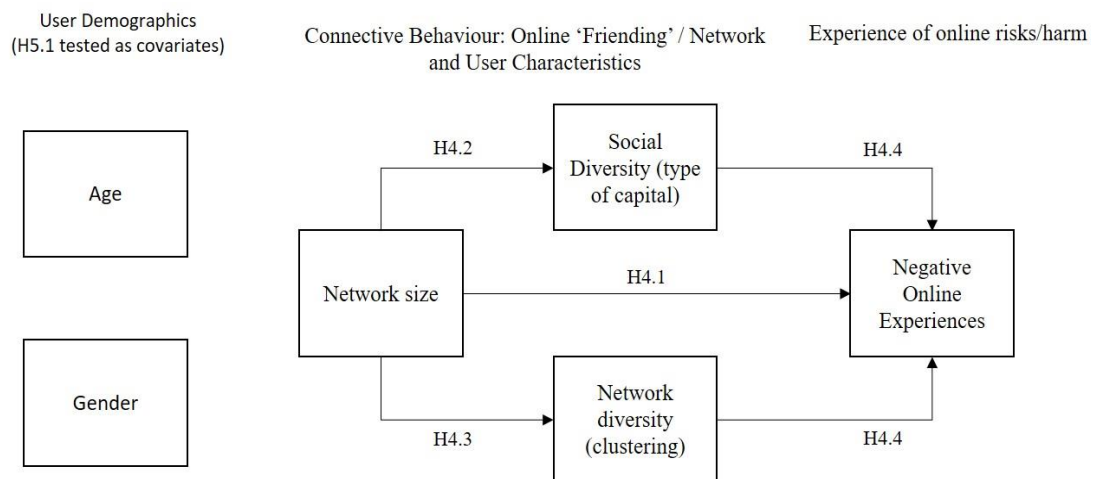


Figure 7.1: Hypothesised mediation model of network size to negative online experiences.

### 7.3 Theoretical background

As previously discussed in Chapter 1 (see Section 1.2.1, p.20), SNS are typically comprised of a multitude of interconnected ego-networks (Hogan, 2008). An ego-network is a personal network in which an individual, the ego, connects with other people (Arnaboldi et al., 2013) via a process of online 'friending'. This concept of 'friending' plays on the traditional associations conjured up by offline friendship, mutual trust, common interests, and an investment of time (Thelwall, 2008), to encourage users to enter into a mutually agreeable digital 'friendship'. Research has suggested that many of the online 'friends' made by an individual follow an offline to online trajectory (Bryant et al., 2006; Ellison et al., 2007). For the average user, SNS are an important means of maintaining pre-existing relationships (Ellison et al., 2007). This affords the individual validation and reassurance that the 'friends' viewing their data are known and trusted contacts. However, this alone may not necessarily be sufficient to guard against vulnerability online.

According to Dunbar's (1998) Social Brain Hypothesis, our limited cognitive capacities and the maintenance demands exerted by social relationships impose

evolutionary constraints on the size of social networks. As a result, an individual should be best equipped to maintain approximately 150 meaningful connections, i.e., contacts that have some direct relationship with the individual and are characterised for the network owner by name, face, and individuating background information. Sociological studies have put the total number of people actively known to an individual, leaving aside meaningfulness, at less than 300 (McCarty et al., 2001). In the realms of SNS, however, networks regularly number in their hundreds and even thousands.

Recent estimates suggest that the average adult Facebook network contains 338 ‘friends’ (Pew Research, 2014). Whilst larger networks (i.e., networks numbering in their hundreds or more) have been positively associated with opportunities for social capital, for instance in terms of gaining social support and informational resources (Ellison et al., 2007), a potential consequence is that they can become progressively unmanageable. One reason is that with increased size the traffic, or flow of information, through a network is likely to increase. Some proportion of this traffic will be difficult to manage for the individual (consider, for example, inappropriate broadcasting) and this proportion will likewise increase with size. Another reason is that the social diversity of the social capital in the network becomes more difficult to manage because the individual connects to ‘friends’ from an increasing number of partially incompatible social spheres (Binder et al., 2012).

Each individual is highly likely to belong to several different social spheres and these will show up in every egocentric network. From family to friends, classmates to work colleagues, different contacts play different roles and occupy different facets within the SNS user’s social network. As such, a social network often affords a complex structure containing multiple contextual social boundaries. In the offline world, these

relationships are carefully managed by the individual enabling them to project desired and moderated representations of the self (Vitak, 2012). On SNS, however, these contextually diverse ‘friends’ can digitally mingle. The contextual boundaries of the heterogeneous social spheres in which they reside are collapsed, forming an increasingly homogenous online existence in the SNS user’s network (Binder et al., 2012; Davis & Jurgenson, 2014; Marwick & boyd, 2011).

This digital mingling can lead to online vulnerability due to unintended collisions between heterogeneous social spheres. Binder and colleagues (2012), in a study on UK-based Facebook users, found that social diversity in a Facebook network resulted in increases in online tension over and above the effects of network size. This was attributed to the unrestricted flow of information across the collapsed contextual social boundaries. For example, a ‘friend’ of the SNS user posting information pertinent to the sphere in which they reside (e.g., a risqué ‘in’ joke) might inadvertently cause tension with ‘friends’ from contextually different spheres within the network, due to the different social norms and expectations that each sphere holds (see Chapter 2, p.59, for a discussion on social norms and expectations).

In a contextually collapsed network, however, it is not just the risk posed by the communications of the SNS user’s friends that can potentially increase vulnerability, but also the communications of the SNS user themselves. SNS impact on our ability to imagine the audience to which we are communicating (boyd, 2007; Litt, 2012). When we engage in communication with individuals or small groups (i.e., in face-to-face settings or via small-scale technology-mediated communications), the audience to whom we are communicating is unambiguous due to immediate visual and/or auditory validation (Litt, 2012). On SNS platforms, however, audiences tend to

become less explicit as the size, diversity, and permanence of the networks increasingly decrease their salience (boyd, 2007).

When an SNS user posts a communication on a SNS, it is likely that their imagined audience does not consist of the complete social network, but rather a subset derived from either technological cues (e.g., the ‘Online’ friend list, frequent likers/commenters) or cognitive references to offline social contexts (Marwick & boyd, 2011). For the SNS user, this potential to misjudge the prospective audience has implications for online vulnerability to negative online experiences, due to an increased likelihood in the SNS user communicating content that is not appropriate for all of the heterogeneous social spheres contained on their network (Binder et al., 2012). On this basis, it is plausible that network size and social diversity of social capital might both be positively related to reported incidences of negative online behaviour (H4.1, H4.2).

Heterogeneous spheres so far have been defined and measured as social diversity, the different types of contacts that can be identified in a network (Binder et al., 2012; McCarty et al., 2001). This leaves the question how these contacts are arranged and interconnected. SNS carry the unique advantage of digitally mapping out network structures, which allows for the identification and quantification of clusters (Smith et al., 2009). Clusters are discernible subgroups characterised by a high degree of interconnectivity and few external connections to other parts of the network. As such, they provide another indicator of different spheres managed by a SNS user. Clusters may not fully coincide with the social categories listed for a network. For example, a category ‘friends known from school’ may be located within one cluster representing the social environment of SNS user at school and another cluster representing an inner friendship circle that is distinct from the wider school context. This study considered

not only the diversity of social contacts (H4.2) as identified by SNS user but also the actual clustering of the SNS user's online network, its structural heterogeneity (H4.3).

In addition, a more comprehensive model to integrate network size, heterogeneity, and vulnerability was tested. While previous research has shown that heterogeneity can have effects independent of size (Binder et al., 2012), findings also suggest that problematic online incidents may well be related to network size through an increase in heterogeneity (Manago et al., 2012). In other words, network size is a driver for developing those network characteristics that lead to higher levels of online vulnerability to negative online experiences, and the size-vulnerability relationship is mediated by these characteristics (H4.4).

#### *7.4 Method*

An integrated data set was generated from cross-sectional survey measures (i.e., social diversity and negative online experiences (Cronbach's  $\alpha = .91$ )) and digitally derived network data (i.e., network size and network clustering (structural diversity)) to explore the relationship between Facebook network characteristics and self-reported incidents of negative online experiences. In this chapter, the notion of online friending is extended from previous chapters to consider not only the number of connections an individual has on their network (network size), but also the type of social capital they connect to, measured from two perspectives. The first perspective was a digitally derived measure of network diversity (network clustering) that represents the structure of the groups that these connections (i.e., the SNS user's social capital) fall into online (i.e., the clustering of online connections in the network). The second perspective was a self-reported measure of social diversity, where participants indicated the presence



of online connections (social capital) in their network from a possible 16 common social groups (Binder et al., 2012; McCarty et al., 2001). Social groups identified ranged in offline tie strength from casual acquaintances to family members. Participants also indicated the presence of online only friends. All measures and procedures discussed in this chapter have been previously outlined in Chapter 3 (see Section 3.6.1, p.117, and Section 3.6.2, p.147).

#### *7.4.1 Sample overview*

Of the initial 506 participants who responded to the online survey during Phase 1 of the research data collection, approximately 35% provided both self-report survey data and digitally derived Facebook metrics. This constituted an overall digital sub-sample of 177 UK based Facebook users (63% female). The mean age of the sub-sample was 22 years 11 months ( $SD = 10.02$ ; Range: 13-77 years). Of these participants, 50 were school-based adolescents (13-17 years,  $M = 15.50$ ,  $SD = 1.71$ ), 63 were university based emerging adults (18 – 21 years,  $M = 18.62$ ,  $SD = .85$ ), and 64 were online adults (22 – 77 years,  $M = 32.75$ ,  $SD = 10.26$ ). It should be noted that due to the sampling methods employed in the research, and the higher number of female and younger participants sampled, the sample may not be fully representative of all Facebook users in the UK. For a full overview of the sample see Chapter 3 (Section 3.6.2.2, p.155). Attrition analyses comparing the digital sample to the initial full sample indicated systematic attrition ( $p < .001$ ). The digital sample had a marginally higher mean age (Survey Only  $M = 19.56$ ,  $SD = 9.66$ ; Digital  $M = 22.98$ ,  $SD = 10.02$ ) and reported a higher number of online social groups (Survey Only  $M = 9.37$ ,  $SD = 3.25$ ; Digital  $M = 11.53$ ,  $SD = 3.59$ ).

## 7.5 Results

### 7.5.1 Preliminary analysis

Descriptive statistics for the main measures are given in Table 7.1. Participants had, on average, experienced a moderate level of overall exposure to negative online experiences whilst using Facebook. Network variables, given their scale, were not normally distributed, which was considered in subsequent analyses. The presence of a small number of large networks containing over 1000 friends led to a positive skew.

*Table 7.1: Descriptive statistics of self-report and digitally derived measures (N = 177; Male = 65, Female = 112)*

	Mean	Standard Deviation	Minimum	Maximum
Negative online experiences	2.75	1.09	1.00	5.00
Network Size	399.40	277.25	4.00	1468.00
Network Clustering	.77	.06	.36	1.00
Social Diversity	11.53	3.59	1.00	16.00
Age	22.98	10.02	13	77

*N.B. Variable range is included here to highlight the distribution of the network characteristics*

A closer inspection of the self-reported social diversity (see Table 7.2) indicated that friends/classmates and family members were most frequent among network contacts. However, it should be noted that 62% of respondents named casual acquaintances, 28% online only contacts, and 25% public figures among their contacts.

*Table 7.2: Frequency of social diversity (by groups) reported by the sample (N=177, Male = 65, Female = 112)*

Social 'Friend' Type	N (%)
Parents	111 (62.7%)
Siblings	137 (77.4%)
Grandparents	44 (24.9%)
Other Family	149 (84.2%)
Best Friend	165 (93.2%)
Friends	175 (98.9%)
Current Classmate	138 (78.0%)
Previous Classmate	152 (85.9%)
Current Teacher/Lecturer	13 (7.3%)
Previous Teacher/Lecturer	54 (30.5%)
Neighbour	50 (28.2%)
Leisure / Interest Group Member	110 (62.1%)
Friend of Friend (FoF)	111 (62.7%)
Casual Acquaintance	109 (61.6%)
Online Only	50 (28.2%)
Celebrities / Public Figures	45 (25.4%)

To control for the non-normal distribution of the network derived data Spearman's Rho correlation coefficients were calculated. These indicated the association between negative online experiences and the different measures of social network characteristics (see Table 7.3). The correlation coefficients did not suggest any multi-collinearity with all coefficients < .70.

Table 7.3: Bivariate correlations ( $N = 177$ )

	1	2	3	4	5
1. Negative online experiences		.381**	-.260**	.370**	-.104
2. Network Size			-.506**	.430**	-.139
3. Network Clustering				-.349**	-.370**
4. Social diversity					-.006
5. Age					

$df = 175$ ; \*\* $p < .001$ , Male = 65, Female = 112

In line with H4.1 digitally derived network size was moderately associated with the self-reported measure of negative online experiences,  $r_s = .38$ ,  $p < .001$ , indicating that having a larger network size was associated with reporting higher rates of negative online experiences. Furthermore, larger networks were associated with higher levels of social diversity (i.e., connecting to more diverse social capital),  $r_s = .43$ ,  $p < .001$ , and higher levels of network diversity (clustering),  $r_s = -.51$ ,  $p < .001$ . This indicated that individuals with larger numbers of online connections might be more likely to be associated with having more socially diverse online networks. Together, these results provided support for both H4.2 and H4.3. It should be noted that as lower network clustering coefficients are indicative of higher network diversity these results need to be interpreted in terms of increases rather than decreases. Negative online experiences moderately correlated with social diversity,  $r_s = .37$ ,  $p < .001$ , and network diversity (clustering),  $r_s = -.26$ ,  $p < .001$ . This indicated that higher levels of both social and structural network diversity were associated with higher reported levels of negative online experiences. Age (H5.1) was significantly associated with network clustering,  $r_s = -.37$ ,  $p < .00$ , being an older SNS user was associated with higher levels of structural network diversity. Age was not significantly associated with any of the other main study variables ( $p > .05$ ).

### 7.5.1.2 Testing for gender differences in the sample means

An analysis of sample means differences for all main study variables (Table 7.4) was conducted to test for possible gender effects (RQ5). Independent t-tests, using gender as the independent variable, are reported. Bootstrapping with 5000 iterations was used due to the non-normal distribution of network size.

*Table 7.4: Sample means (standard deviations) for male and female participants (Male (coded as 0) = 65; Female (coded as 1) = 112)*

	Male Mean (SD)	Female Mean (SD)
1. Network size	342.23 (256.38)	432.55 (284.54)
2. Social diversity	8.32 (2.77)**	9.57 (2.41)**
3. Network clustering	.63 (.10)**	.58 (.08)**
4. Negative online experiences	2.54 (1.08)	2.87 (1.08)
5. Age	21.94 (10.17)	23.38 (9.60)

*N* = 177; \*\**p* < .001

Significant differences were found between the sample means for male and female participants for both measures of diversity. The female sample of 112 participants reported being connected to significantly more types of socially diverse capital than the male sample of 65 participants,  $t(175) = -3.14, p = .002$ . Females also reported significantly higher levels of structural network diversity,  $t(175) = 4.21, p < .001$ . As before, it should be noted that lower network clustering coefficients are indicative of higher network diversity. No significant differences between the gender groups were evident for age, network size, and negative online experiences,  $p > .05$ . The significant mean differences highlighted the importance of controlling for gender sample biases in the remaining analyses.

### 7.5.2 Predictors of negative online experiences

To test further H4.1, H4.2, and H4.3, a set of bootstrapped hierarchical regression analyses were performed with negative online experiences as the outcome variable. Due to initial violations of normality in the network size variable, all variables were square root transformed prior to the analyses. Following the transformation all assumptions of the multiple regressions were met. An overview of the regression analyses can be found in Table 7.5.

*Table 7.5: Hierarchical regression analysis (N = 177, Male (coded as 0) = 65, Female (coded as 1) = 112)*

Outcome variable: Negative online experiences				
	Model 1: Size b [95% CI]	$\beta$	Model 2: Diversity b [95% CI]	$\beta$
<i>Demographics</i>				
Age	-.049 [-.099, -.003]*	-	-.069 [-.126, -.024]*	-.185
		.130		
Gender	.074 [-.019, .175]	.105	.028 [-.064, .125]	.039
<i>Network Variables</i>				
Network size	.017 [.010, .024]***	.343	.007 [-.002, .016]	.139
Network clustering			-1.229 [-2.125, -.325]*	-.210
Social diversity			.132 [.002, .257]*	.180
Constant	1.487 [1.163, 1.820]***		2.355 [1.172, 3.595]***	
	F(3, 176)=12.425***		F(5, 176)=10.733***	
R <sup>2</sup>	.177		.239	
R <sup>2</sup> Change			.062**	

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ . b = unstandardized;  $\beta$  = standardised coefficients; CI = confidence interval

H4.1 stated that network size would be positively related to negative online experiences. In the first instance, digitally derived Facebook network size, age, and gender were entered as the predictor variable. The overall regression model was significant,  $F(3, 176) = 12.43$ ,  $p < .001$ , accounting for 17.7% of the variance of exposure to negative online experiences. In line with the initial correlational analysis, network size was an important and significant positive predictor of negative online experiences,  $\beta = .34$ ,  $p < .05$ , thus providing support for H4.1. For this sample, larger network sizes predicted higher reported rates of negative online experiences. To a lesser but still significant extent, age was negatively related to negative online experiences,  $\beta = -.13$ ,  $p < .05$ , indicating that being an older participant predicted fewer reported instances of negative online experiences. Gender was not a significant predictor in the model,  $p > .05$ . Partial support was therefore gained for H5.1.

H4.2 and H4.3 indicated that diverse social capital and structural network diversity would be positively related to negative online experiences. The regression model was expanded to include social diversity and network clustering as predictors of negative online experiences. Once again, the overall model was significant,  $F(5, 176) = 10.73$ ,  $p < .001$ , now accounting for 23.9% of the variance of online vulnerability. This represented a significant 6.2% change in the  $R^2$  value from the previous model,  $p = .001$ .

Network clustering and reported social diversity added significantly to the predictive model (both  $p < .05$ ). The standardised beta coefficients indicated that diversity, as typified by higher levels of social diversity,  $\beta = .18$ ,  $p < .05$ , and lower levels of network clustering coefficient,  $\beta = -.21$ ,  $p < .05$ , are predictive of higher levels of negative online experiences. This means both H4.2 and H4.3 were supported. Again, age was a significant and negative predictor in the model,  $\beta = -.19$ ,  $p < .05$ , suggesting

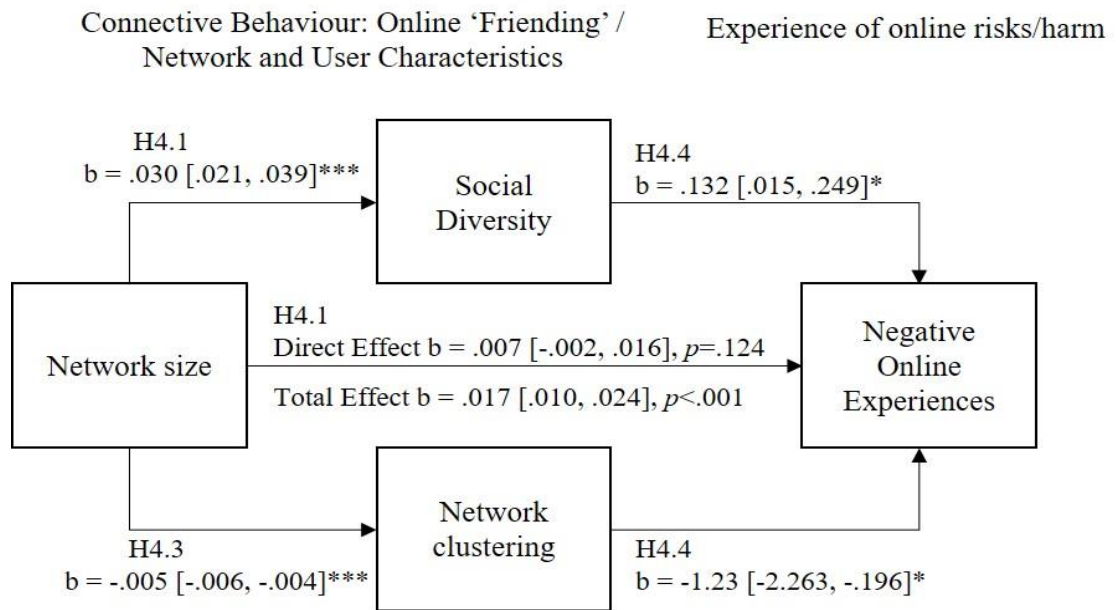
that negative online experiences might be more apparent in the younger Facebook users amongst the sample. Introducing social diversity and network clustering to the model rendered the predictive value of network size non-significant. This was indicative of a potential mediating influence of these variables on the relationship between network size and negative online experiences, tested in detail in Section 7.5.3.

#### *7.5.3. Mediating the effects of network size on online vulnerability*

A bootstrapped multiple mediation approach (Preacher & Hayes, 2008) was adopted to test H4.4, using PROCESS (Hayes, 2015), a macro developed for use with SPSS. Such models have been likened to structural equation models (as used in Chapter 4, Section 4.5.2, p.184) in that they enable researchers to consider which part of an explanatory variable's effect on an outcome variable can be explained by a mediating variable (Brooks et al., 2014).

H.4 stated that effects of network size on negative online experiences would be mediated by social and network diversity. The model testing this hypothesis is illustrated in Figure 7.2. Age and gender were entered as covariates in the model. It should be noted that PROCESS only provides unstandardised coefficients (Hayes, 2015).





\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$   $b$  = unstandardised coefficients

Figure 7.2: Path representation of the mediation model (H4.4;  $N = 177$ )

An analysis of the 95% bias corrected (BC) confidence intervals (Table 7.6) of the indirect effects of social diversity and network clustering indicated that they significantly mediated the association between network size and negative online experiences. Both mediated paths were found to be significant in terms of both the traditional Sobel Test ( $p < .05$ ), associated with the Baron and Kenny (1986) causal steps approach to mediation, and also via the analysis of the bootstrapped confidence intervals generated by the indirect effects (Preacher & Hayes, 2008). Furthermore, the completely standardised indirect effect,  $\beta = .20$ , 95% BCa CI [.10, .32], was indicative of a moderate overall effect size for the model. This means that H4.4 received full support.

Table 7.6: Analysis of indirect effects for the mediation model ( $N = 177$ ; Male = 65, Female = 112)

	Unstandardised Point Estimate	Standardised Estimate	Product of Coefficients		$p$	Bootstrapping*	
						Bias Corrected	
			SE	Z		95% CI	
						Lower	Upper
Social diversity	.004	.078	.002	2.087	.037	.001	.008
Network clustering	.006	.123	.003	2.269	.023	.002	.012

\*Bootstrapping based on 5000 samples

As shown previously in Figure 7.2 the indirect effect of social diversity was found to have a positive association with network size,  $b = .03$ ,  $p < .001$ , and a positive association with negative online experiences,  $b = .13$ ,  $p < .05$ . These results imply that larger network size influences the level of social diversity in the network, which in turn influences the likelihood of reporting negative online experiences. The indirect effect of network clustering was found to have a negative association with network size,  $b = -.01$ ,  $p < .001$ , and a negative association with negative online experiences,  $b = -1.23$ ,  $p < .05$ . As lower network clustering coefficients are indicative of higher network diversity these results need to be interpreted in terms of increases rather than decreases. The indirect effects therefore imply that larger network sizes influence network diversity via clustering, which in turn influences the likelihood of negative online experiences being reported. Inspection of age and gender (entered as covariates in the model – H5.1), indicated that females were more likely to have higher levels of

social diversity,  $b = .16$ ,  $p < .05$ , and network diversity,  $b = -.02$ ,  $p < .05$ , in their networks. Being an older participant was predictive of higher levels of network diversity,  $b = -.002$ ,  $p < .001$  and lower levels of negative online experiences,  $b = -.01$ ,  $p < .05$ .

## *7.6 Discussion*

The present analyses explored the impact of social and structural network characteristics of online friending on the vulnerability of SNS users to negative online experiences. In doing so, it provided support for RQ4 and RQ5. Utilising a multi-methods approach to online data collection and analysis, the results provide an innovative examination of online social networking characteristics. The main findings can be summarised as follows. First, consistent with the network size hypothesis (H4.1), larger network sizes were associated with higher levels of negative online experiences. Second, consistent with the hypotheses that social and structural network diversity positively predicts online vulnerability (H4.2 and H4.3), higher levels of self-reported social diversity (i.e., diverse social capital) and digitally derived network diversity (i.e., structural diversity) were associated with higher levels of negative online experiences. Furthermore, social and structural network diversity mediated the relationship between network size and negative online experiences (H4.4). Effects of age and gender on the main study variables were also evidenced (H5.1).

The findings revealed that individuals with larger network sizes tended to be more prone to reporting negative online experiences on ego-centric SNS, largely due to higher levels of social and structural diversity in their networks. One explanation for this is contextual collapse. As the number and variety of online contacts increases, the

boundaries between heterogeneous social spheres collapse (Vitak, 2012), rendering it difficult for the individual and their contacts to effectively imagine their target audience when sharing content (Litt, 2012; Marwick & boyd, 2011). Content intended for a particular ‘imagined’ sphere becomes visible across the network, often with little regard for its appropriateness for those outside the ‘imagined’ sphere. The high visibility of such unmoderated content on ego-centric online networks facilitates increases in network tension (Binder et al., 2012) within the network and also potential vulnerability of the individual and their contacts, due to the increased vulnerability to the exposure of potentially contentious and inappropriate material.

A novel aspect to this perspective is provided by the finding that the number of different types of contacts (social diversity) and the clustering of these contacts (network diversity) were both predictive of negative online experiences. Put differently, clusters did not fully align with categorisation of contacts, and both sources of information independently help to explain the challenges that arise from the maintenance of online networks. Social spheres as clusters may refer to life stages (e.g., contacts from school days) or to particular environments (e.g., contacts from the office), in which case they would still be likely to contain a diverse range of social ties. Conversely, social spheres as different categories of others may well be distributed over several clusters (e.g., all closer friends, no matter where they are usually encountered). Broadcasting in SNS therefore jeopardises the balance within clusters as much as between clusters. Addressing the exact composition of clusters in terms of categories of others is beyond the scope of the present study. However, an exploration of the characteristics of potential problematic individuals who might reside within those clusters is presented later in the thesis in Chapters 8 and 9.

The findings presented in this chapter build on the analyses presented in Chapters 4 (see Section 4.5, p.179) and 5 (see Section 5.4, p.202) in providing support, via the use of a novel combined self-report and digital dataset, for the association between connective behaviour and negative online experiences (RQ4). It should be noted however, that online friending constitutes just one potential coping mechanism that might be employed by a SNS user seeking to regulate psychological needs deficits. Digital collection and analysis of other behaviours such as self-disclosure, while technologically plausible, is beyond the time and ethical boundaries of the present thesis. For this reason, additional research into connective behaviours is recommended in order to better understand the way in which such behaviours influence an individual's susceptibility to negative online experiences.

Implications for those designing and indeed using SNS can be derived from the present analysis, to the extent that the facilities to manage and moderate online communities can be both encouraged and improved. The technological capability to group contacts and moderate posts has been available on SNS since the start of the decade, however, many users do not engage with it due to lack of knowledge and/or its labour intensive current format (Kelley, Brewer, Mayer, Cranor, & Sadeh, 2011). Facebook for instance requires users to assign group membership to individual contacts, which for an existing network numbering in the hundreds or even thousands presents an arduous and improbable task. A better understanding of the potential implications of engaging in large-scale and unmoderated communication on online networks has the potential to encourage safer connection practices and from a design perspective reinforces the need for a more intuitive and time-efficient network interface.

The present analysis provides significant and original support for the relationship between the social and structural network characteristics of online friending and an

individual's vulnerability to negative online experiences. In doing so, it increases our understanding of the potential detrimental effects of the contextual collapse of social spheres on online networks by adding digitally derived information to the largely self-report based theoretical standpoints of previous social network literature (Binder et al., 2012; Vitak, 2012). In Chapters 8 and 9, these findings are further explored to consider the role that specific network contacts might have on an individual's vulnerability to negative online experiences.

## **Chapter 8: Online friending: The impact of non-standard online profiles on SNS users' vulnerability to negative online experiences.**

### *8.1 Chapter introduction*

Ego-centred online SNS sites such as Facebook and LinkedIn actively encourage people to provide a wealth of personal information. While some studies have shown online presentations of the self to be generally accurate (Back et al., 2010; YouYou, Kosinski, & Stilwell, 2015), it has been estimated that approximately 5 to 11% of Facebook profiles might be erroneous, in that they do not provide a true, accurate, or complete representation of the profile holder (Facebook, 2015).

Safely navigating an online network might be compromised by the presence of 'friends' whose profiles are not characteristic of traditional online connections. Indeed, most SNS, and most Internet services, do not recognise individuals, but user accounts. The assumption, that all SNS user accounts represent individual people is not warranted, with some profiles being used to represent non-personal entities (e.g., groups, businesses). Accounts may also include or omit information that is important for the SNS user to reliably identify other contacts. Non-standard online contacts can therefore make it more difficult for a user to form an impression of their actual audience. At present, it is not possible to identify with great certainty profiles on a network that might offer negative consequences to the SNS user and their connections. However, digital ego network data offer some opportunities to identify characteristics that might be indicative of 'non-standard' connections. Chapter 8 tests for the presence and potential impact of these non-standard characteristics by building directly on the analysis presented in Chapter 7.

It should be noted that sections of the introduction, analyses, and discussion presented in Chapter 8 are partly presented in/based on an article published in an academic journal (Buglass et al., 2016, see Appendix 9 for further details).

## *8.2 Hypothesised model*

Research has linked large, diverse online networks to a higher presence of superficial and unknown contacts (Manago et al., 2012). Assuming a small percentage of non-standard characteristics to be present in most active Facebook networks, it follows that the absolute frequency of such characteristics will increase with growing network size. Networks that run into hundreds, or thousands, of online contacts are unexceptional on Facebook, and larger networks are likely to exhibit a non-negligible number of non-standard characteristics for mere probabilistic reasons. Furthermore, studies have also suggested that users holding larger networks may be more inclined to engage in “promiscuous friending activities” (Stefanone et al., 2011; Stefanone, Lackaff, & Rosen, 2008). From this perspective, the more the SNS user engages in these activities, the less consideration the individual might give to a profile’s actual validity or status, when adding online contacts.

The model tested in Chapter 7 (see p.249), using a combination of digitally derived network data and self-report measures, indicated that larger network sizes were associated with higher reported levels of negative online experiences (H4.1). Further, it demonstrated that social (H4.2) and structural network diversity (H4.3) were predictive of negative online experiences. Social and structural network diversity also mediated the relationship between network size and negative online experiences (H4.4). This chapter seeks to further investigate the digital network data considered in Chapter 7, by attempting to identify the extent to which the presence of profiles



displaying non-standard characteristics (e.g., misclassified profiles; see Chapter 2, Section 2.3.1.1.4.2, p.75), might affect the potential susceptibility of SNS users to negative online experiences in the tested model.

The research question to be addressed in this chapter is:

*RQ5: Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?*

To address this question three hypotheses (further to those presented in Chapter 7) will be tested, using a multiple mediation model (see Figure 8.1):

*H5.1 The age and gender of SNS users will influence the reported level of exposure to negative online experiences.*

*H5.4 Individuals with networks containing higher levels of users exhibiting non-standard user/profile characteristics will report higher levels of exposure to negative online experiences.*

*H5.5 The presence of non-standard user/profile characteristics will mediate the relationship between the size and diversity of an individual's online network and their reported exposure to negative online experiences.*

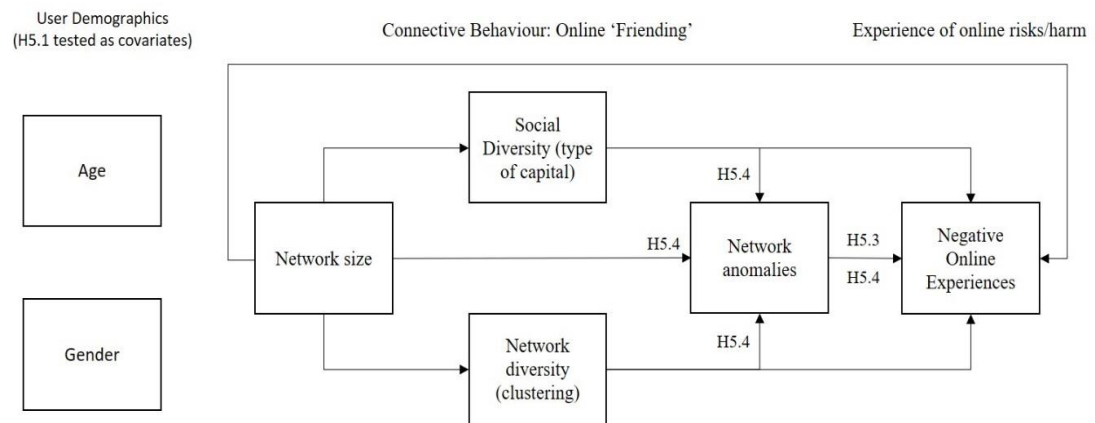


Figure 8.1: Hypothesised mediation model of network size to negative online experiences, via non-standard profiles.

### 8.3. Theoretical background

Digitally derived network data offers researchers the capacity to gain an insight into not only the size and structure of a Facebook user's network (see Chapter 7); it also facilitates the identification of profiles that deviate from the norm. In the present chapter, non-standard profiles (see Chapter 2, Section 2.3.1.1.4.2, p.75) are considered from the perspective of misclassified profiles, use of obvious pseudonyms, missing information, and socially isolated contacts. These types of non-standard profile characteristic, whilst theorised, have not previously been digitally tested.

Misclassified profiles occur when the SNS account holder creates a profile that does not match the general norms or expectations of a traditional profile. According to Facebook's (2015) annual report to the USA Securities Exchange Commission, approximately 2% of all monthly active profiles on Facebook are misclassified profiles. Whilst 2% may not at first appear substantial, in the context of Facebook, which currently has approximately 1.39 billion monthly active users, this equates to an estimated 27.8 million profiles.

Misclassified profiles are entities that should be represented on an online SNS by a 'page' or specific space and not by a personal profile. They are often representative of small companies, organisations, social interest groups, and even pets. Misclassified profiles may occur due to user-error (i.e., the account holder is not familiar with the terms and conditions of the site) or potentially malicious purposes (i.e., a person pretending to be a known company using a fake profile to gain data and/or money from unsuspecting users).

The use of a pseudonym is a form of identity concealment (Hogan, 2012). Full pseudonyms offer a completely non-representative name – often made up or indicative of a figure from popular culture. Partial pseudonyms might use one of the individual's real names in addition to a "made up" name (i.e., Super Sarah). Several high profile SNS implement a 'Real Name Policy' for which they actively encourage the use of real names (Facebook, 2015; LinkedIn, 2015). The policy is indicative of a growing trend on online platforms toward non-anonymised communication (Hogan, 2012), driven in part by a desire to influence the growing problem of fake or erroneous profiles. Whilst the presence of pseudonym profiles on the network is not necessarily indicative of potential harm to the SNS user (Hogan, 2012), it has been suggested that such online anonymity may increase the likelihood of anti-normative behaviour being experienced (Cho, Kim, & Acquisti, 2012).

Inaccurate or missing data in profiles does not match the general norms or expectations of a standard SNS profile. As suggested by Herring and Martinson (2004), the non-disclosure of personal attributes, such as gender, not only potentially impedes an individual's ability to validate the identity of their prospective connection but may also limit opportunities for them to moderate their communications in a manner

appropriate to the norms and conventions associated with their prospective connections.

Social outliers are individuals that are connected to the SNS user only. They are socially distant contacts who do not share any mutual friends with the SNS user and as such lack validation from other members of the ego network. Whilst some have theorised that such bridging or weak ties can provide the SNS user with diversified social and informational support (Burt, 2000), others have suggested that outliers may promote friction within the network as they face lower social and reputational costs (Brass, Butterfield, & Skaggs, 1998). Interestingly, outliers may in time become more highly connected within the network. As previously discussed in Chapter 2 (see Section 2.3.1.1.4, p.71), research has indicated that adolescent SNS users might be prone to accepting friend requests from mutual friends and acquaintances of people that they are actively connected to, even if they do not know them personally (Nagle & Singh, 2009) Furthermore, Boshmaf, Muslukhov, Beznosov, and Ripeanu (2011), have found that SNS users were almost 50% more likely to accept a friend request if the connection had at least one mutual friend.

The presence of non-standard network connections has the potential to further complicate the SNS user's ability to effectively manage and moderate their online communications. While users view their close social spheres as points of reference for generating their target audience on social media (Marwick & boyd, 2011), sporadic cases of non-standard profiles are likely to be less salient. A potential consequence of this lack of salience is further social tension due to contextual collapse, from the perspective of both the ego and the non-standard profile holder. Additionally, the SNS user's vulnerability to malicious behaviours such as data misuse, and harassment is likely to increase due to the privacy implications of sharing data and communications

with profiles that might not be easily validated. The present chapter uses a unique methodological approach to test the extent to which the presence of these non-standard connections in a network influences an SNS user's reported exposure to negative online experiences.

#### *8.4 Method*

An integrated data set was generated from cross-sectional survey measures (social diversity and negative online experiences) and digitally derived network data (network size, network clustering, and non-standard profile (gender-hidden profiles, misclassified profiles, pseudonym represented profiles, and network outliers) to explore the relationship between Facebook network characteristics and online vulnerability. All measures and procedures have been previously outlined in Chapter 3 (Section 3.6.2, p.147). A description of the digital sub-sample used in this analysis ( $N = 177$ , 63% female) can also be found in Chapter 3 (see p.155).

#### *8.5 Results*

The results presented in this analysis build directly on those presented in Chapter 7.

##### *8.5.1 Preliminary analysis*

Descriptive statistics for the main measures are given in Table 8.1. As previously described in Chapter 7 (see Section 7.5.1, p.249), participants had on average experienced a moderate level of negative online experiences whilst using Facebook with the mean exposure being 2.75 ( $SD = 1.09$ , on a scale from 1 to 5). Network sizes ranged from 4 connections to 1468, producing a non-normal distribution ( $M = 399.40$ ,  $SD = 277.25$ ). The occurrence of a skewed distribution was in line with previous

studies utilising digital network size as a variable (Brooks et al., 2014; Nabi, Prestin, & So, 2013).

Ninety-five percent of the sample networks considered were found to have connections displaying non-standard profile characteristics present in their networks. The mean number of profiles displaying non-standard characteristics ranged from 2.40 for gender-hidden profiles to 8.86 for network outliers.

*Table 8.1: Descriptive statistics of self-report and digitally derived measures (N = 177, Male = 65, Female = 112)*

	Mean	Standard Deviation	Minimum	Maximum
Negative OE	2.75	1.09	1.00	5.00
Network Size	399.40	277.25	4.00	1468.00
Network Clustering	.77	.06	.36	1.00
Social Diversity	9.11	2.61	1.00	16.00
Misclassified Profiles	3.18	4.36	.00	27.00
Gender-Hidden Profiles	2.40	3.09	.00	21.00
Pseudonym Profiles	2.49	5.41	.00	57.00
Network Outliers	8.86	11.69	.00	90.00
Age	22.85	9.81	13	77

OE = online experiences

To control for the non-normal distribution of the network derived data Spearman's Rho correlation coefficients were calculated. These indicated the association between exposure to negative online experiences and the different measures of social network characteristics (see Table 8.2). The correlation coefficients did not suggest multicollinearity with only one coefficient > .70.

Table 8.2: Bivariate correlations ( $N = 177$ )

	2	3	4	5	6	7	8	9
1. Negative OE	.383**	-.260**	.370**	.394**	.201**	-.033	.166*	-.104
2. Network Size		-.506**	.430**	.627**	.460**	.271**	.377**	-.139
3. Network Clustering			-.349**	-.529**	-.441**	-.421**	-.716**	-.370**
4. Social 'friend' types				.339**	.326**	.135	.305**	-.006
5. Misclassified					.516**	.265**	.494**	.081
6. Pseudonym						.331**	.408**	.077
7. Gender-hidden							.482**	.543**
8. Network outliers								.488**
9. Age								

Note:  $df = 175$ . \* $p < .05$ . \*\* $p < .001$ , OE = online experiences, Male = 65, Female = 112

Correlations between exposure to negative online experiences and the non-standard network contacts provided partial support for H5.4. The presence of misclassified profiles,  $r_s = .39, p < .001$ , profiles identified via pseudonyms,  $r_s = .20, p < .05$ , and network outliers,  $r_s = .17, p < .05$ , were associated with higher reported levels of negative online experiences. This indicated that for SNS users who connect to profiles displaying these non-standard characteristics, there might be a higher likelihood of them being associated with experiencing negative occurrences online. No significant association was found between gender-hidden profiles and exposure to negative online experiences. All non-standard profile characteristics were significantly correlated with both network clustering and social diversity, with the only exception being the relationship between social diversity and gender-hidden profiles ( $p > .05$ ). Significant correlations between age and network clustering, gender-hidden profiles and network outliers, indicated that being an older participant was associated with having a higher number of structural groups on the network, and higher levels of contacts who did not wish to disclose their gender and individuals who were only known to the participant,  $p < .001$ .

#### *8.5.1.2 Testing for gender differences in non-standard profiles*

Building on the analysis of mean differences provided in Chapter 7 (see p.252), an analysis of sample differences for the non-standard profile variables (Table 8.3) was conducted to test for possible gender effects (H5.1). Independent t-tests, using gender as the independent variable, are reported. Bootstrapping with 5000 iterations was used due to the non-normal distributions of the non-standard network variables.



*Table 8.3: Sample means (standard deviations) for male and female participants  
(Male (coded as 0) = 65; Female (coded as 1) = 112)*

	Male Mean (SD)	Female Mean (SD)
Misclassified Profiles	2.45 (4.66)*	3.61 (4.14)*
Pseudonym	2.20 (3.77)	2.65 (6.17)
Gender-hidden	2.43 (3.88)	2.38 (2.55)
Network outliers	5.69 (9.29)***	10.70 (12.55)***

*N = 177; \*\*\* $p < .001$ ; \* $p < .05$ .*

The tests indicated that the number of misclassified profiles identified from the network data was greater for females than men,  $t(175) = -2.50$ ,  $p = .019$ . There was also a significant difference in the number of network outliers, with female networks containing a higher number than male networks,  $t(175) = -4.39$ ,  $p < .001$ . There were no significant differences evident for pseudonym or gender hidden profile characteristics,  $p > .05$ .

### *8.5.2 Regression analysis*

The presence of non-standard network characteristics, as postulated by H5.4, should predict reported rates of negative online experiences. To test this, the bootstrapped hierarchical regression analyses discussed in Chapter 7 (see Section 7.5.2, p.253) were extended to include the number of misclassified profiles, gender-hidden profiles, pseudonym-represented profiles, and network outliers as predictors of online exposure to vulnerability. Due to initial violations of normality by digitally derived network size and the non-standard profile characteristics, all variables were square root transformed prior to the analysis. Following the transformation all assumptions of the multiple regression were met. An overview of the extended regression analyses can be found in Table 8.4.

Table 8.4: Hierarchical regression analysis ( $N = 177$ , Male (coded as 0) = 65, Female (coded as 1) = 112)

	Outcome variable: Negative online experiences					
	Model 1: Size b [95% CI]	$\beta$	Model 2: Diversity b [95% CI]	$\beta$	Model 3: Non- standard characteristics b [95% CI]	$\beta$
Age	-.049 [-.099, -.003]*	-.130	-.069 [-.126, -.024]*	-.185	-.034 [-.101, .034]	-.090
Gender	.074 [-.019, .175]	.105	.028 [-.064, .125]	.039	.006 [-.101, .034]	.008
Network size	.017 [.010, .024]***	.343	.007 [-.002, .016]	.139	.006 [-.005, .017]	.123
Network clustering			-1.229 [-2.125, -.325]*	-.210	-1.112 [-2.190, -.078]*	-.193
Social diversity			.132 [.002, .257]*	.180	.146 [.025, .262]*	.199
Misclassified					.069 [.012, .124]*	.238
Gender-hidden					-.055 [1.115, .001]	-.156
Pseudonym					-.038 [-.081, .019]	-.127
Outliers					.001 [-.042, .039]	.007
<i>Constant</i>	1.487 [1.163, 1.820]***		2.355 [1.172, 3.595]***		2.097 [.875, 3.376]**	
	F (3, 176) = 12.425***		F (5, 176) = 10.733***		F (9, 176) = 7.451***	
R <sup>2</sup>	.177		.239		.287	
R <sup>2</sup> Change			.062**		.048*	

Note: \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .  $b$  = unstandardised,  $\beta$  = standardised

The addition of the non-standard profile variables imposed a significant 4.8% change in the  $R^2$  value ( $p = .03$ ) increasing the total variance explained for exposure to negative online experiences to 28.7%. Of the four non-standard profile characteristics identified in the data, only misclassified profiles proved to be significant,  $b = .07$ ,  $\beta = .24$ ,  $p < .05$ . This indicated that higher levels of misclassified profiles on an individual's network predicted higher levels of reported negative online experiences. Social diversity,  $b = .15$ ,  $\beta = .20$ ,  $p < .05$ , and network clustering,  $b = -1.11$ ,  $\beta = -.19$ ,  $p < .05$ , continued to be significant predictors of negative online experiences, however, the inclusion of the non-standard profile characteristics lessened the overall impact of these variables on the model. Network size, age, and gender were not significant,  $p > .05$ . In sum, H5.4 received partial support.

### *8.5.3 Mediation analysis of network contacts with non-standard characteristics*

A mediation model was tested to further investigate the hypothesised role of non-standard network characteristics in the network size to negative online experiences relationship (H5.5). Building on the analyses presented in Chapter 7 (see Section 7.5.3, p.255), the model, considered potential indirect effects from both the perspective of parallel and serial mediators. The analysis of serial multiple moderation effects via the PROCESS macro does not produce an indication of significance via the traditional Sobel test (Hayes, 2012). Alternatively, an analysis of the 95% BC CI bootstrapped tests is used. Age and gender of the SNS users were entered as covariates in the model (Hayes, 2009).

The confidence intervals for the model (Table 8.5) indicated that there were some significant indirect effects present between the association of network size and

negative online experiences. The overall effect size for the model,  $\beta = .29$  95% BC CI [.16, .44], as tested by the completely standardised indirect effect, was shown to be moderate (Preacher & Kelley, 2011).

*Table 8.5: Analysis of indirect effects (Paths a x b(x d)), N = 177*

Indirect Path	Unstandardised Effect	Standardised Effect	Bootstrapping*		
			Boot SE	Bias Corrected 95% CI	
				Lower	Upper
1. Size→Social diversity→Negative OE	.0039	.078	.0018	.0006	.0079
2. Size→Social diversity→Cluster→Negative OE	.0007	.015	.0005	.0001	.0021
3. Size→Social diversity→Misc.→ Negative OE	.0000	-.000	.0004	-.0008	.0007
4. Size→Social diversity→Cluster→Misc.→	.0003	.005	.0002	.0001	.0008
5. Size→Cluster→ Negative OE	.0038	.076	.0021	.0001	.0086
6. Size→Cluster→Misc→ Negative OE	.0014	.027	.0008	.0002	.0034
7. Size→Misc.→ Negative OE	.0045	.089	.0021	.0007	.0088

*Note: \*Bootstrapping based on 5000 samples. Misc. = Misclassified Profiles. OE = online experiences, Male = 65, Female = 112.*

In terms of the parallel indirect effects, social diversity continued to be a significant mediator in the relationship between network size and exposure to negative online experiences, indicating as before (see Chapter 7, p.255), that having a larger network size was associated with higher reported levels of social diversity in the network,

which in turn was associated with higher levels of exposure to negative online experiences. Misclassified profiles also offered a significant indirect effect, with larger network sizes being associated with higher levels of misclassified profiles, and in turn higher levels of negative online experiences. No other non-standard profile characteristics provided significant indirect effects,  $p > .05$ .

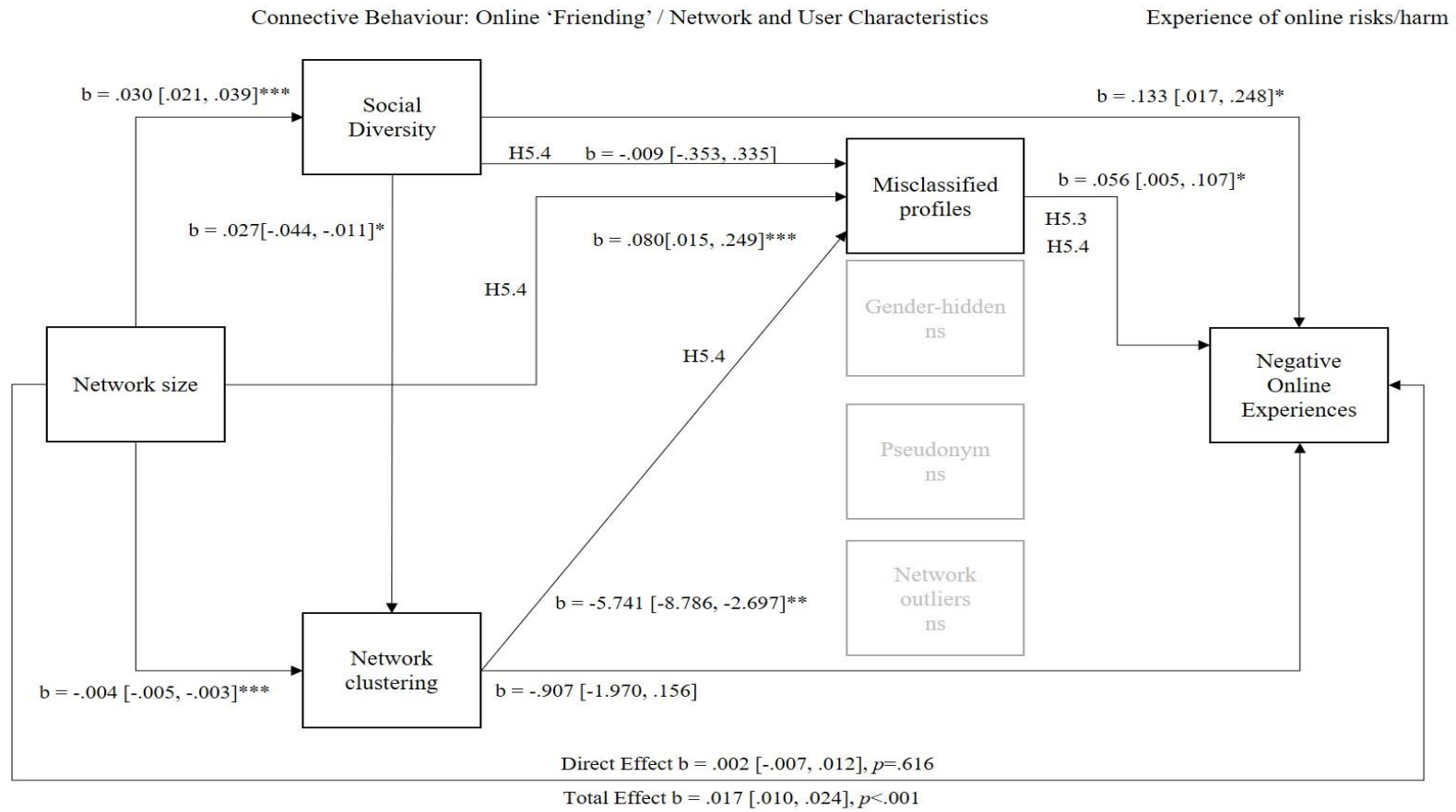


Figure 8.2: Path representation of mediation and effects for misclassified profiles. (Note:  $*p < .05$ .  $**p < .01$ .  $***p < .001$ .  $b$  values represent unstandardised coefficients (as reported by PROCESS).

Interestingly, the inclusion of misclassified profiles appeared to render the indirect path relationship between network clustering and negative online experiences (Figure 8.2) non-significant,  $p > .05$ . However, the overall indirect effect between network size, network clustering, and negative online experiences remained significant in terms of the overall bootstrapped indirect effect (see Table 8.5), although the overall effect size was somewhat diminished. This result complemented the previous findings of the hierarchical regression analyses and partially supports the idea of non-standard profile characteristics playing a mediating role in this relationship (H5.5).

The mediating role of non-standard profiles on the relationship between network clustering and negative online experiences was confirmed via the analysis of the serial indirect effects in the model. A significant serial indirect effect was found between network size, network clustering, misclassified profiles, and negative online experiences. This significant effect was evident in both the path relationships (Figure 8.2) and also the overall bootstrapped effect (Table 8.5). For network clustering, the indirect effect implies that having a larger network size is associated with higher levels of network diversity (due to a decrease in the network clustering coefficient). Higher levels of network diversity are then associated with higher levels of misclassified profiles, which in turn are associated with higher levels of reported exposure to negative online experiences.

Non-standard profiles were not found to have a significant indirect effect on the relationship between social diversity and negative online experiences. However, when social diversity was considered as a serial mediator with both network clustering and non-standard profiles it did produce significant indirect effects on the relationship between network size and negative online experiences. As such, having a larger network size was associated with higher social diversity. Higher levels of social

diversity were associated with reductions in the network clustering coefficient, therefore indicating higher levels of network diversity. Higher levels of network diversity were associated with a higher likelihood of non-standard profiles being present in the SNS user's network, which was also associated with higher levels of reported exposure to negative online experiences.

### *8.6 Discussion*

The present analyses explored the impact of friending online profiles exhibiting non-standard characteristics on SNS users' reported exposure to negative online experiences. In doing so, it provided further support for RQ5. The main findings can be summarised as follows: Partial support was obtained for the non-standard characteristics hypothesis (H5.4) indicating that profiles exhibiting certain non-standard network characteristics are positively predictive of exposure to negative online experiences. Misclassified profiles were predictive of higher levels of negative online experiences; however, no other non-standard characteristics were found to be significant predictors. Misclassified profiles also provided a mediating role in the relationship between structural network characteristics (e.g., network size and network clustering) and reported exposure to negative online experiences (H5.5).

The occurrence of non-standard network profile characteristics and their potential impact on an individual's susceptibility to negative online experiences rendered mixed results. Misclassified profiles were found to significantly predict higher levels of negative online experiences. A possible reason for this is that misclassified profiles represent a diverse array of non-personal entities. When an individual connects to a misclassified profile, they share their personal timeline and content with the likes of businesses, student/interest groups, and possibly even 'fake' profiles. Many users of



ego-centric online SNS knowingly upload and share vast amounts of data (Debatin et al., 2009). Misclassified profiles, therefore, gain potential access to the SNS user's likes, dislikes, location, and photographs, presenting the individual with a potential minefield of opportunities for data driven online vulnerability such as data misuse, which may ultimately impact on their psychological and reputational wellbeing.

Interestingly, misclassified profiles were also found to mediate the relationship between structural characteristics of network size and diversity (network clustering) and exposure to negative online experiences, indicating that higher levels of negative online experiences being experienced in large and structurally diverse networks are potentially enhanced by the presence of misclassified profiles. In a large, structurally diverse network, misclassified profiles may make the imagined audience unimaginable, as the SNS user is presented with the complex task of determining not only 'who' but 'what' they are sharing their content with. The potential for contextual collapsed (Vitak, 2012), therefore renders the presence of misclassified profiles on a network potentially problematic to the SNS user.

The remaining non-standard profile characteristics were non-significant predictors of negative online experiences. Whilst, not providing support for the hypotheses, the results provide an interesting counter to several current theoretical debates. They therefore, offer a significant contribution in their own right. In the case of pseudonym use and gender-concealment, the predictive non-significance of these non-standard characteristics calls into question a core argument of the 'real-name' policies currently being mooted by many online SNS (Hogan, 2012). Promoters of the policy claim that such forms of identity concealment might promote potentially negative behaviours on a network and therefore increase the online vulnerability of wider network users (Cho et al., 2012; Hogan, 2012). The results of this study imply that individuals adopting

such non-standard characteristics may not necessarily be ill intentioned and may in some cases be merely exercising their right to express their identity online in a manner unbound by the potential risks and restrictions of non-anonymised data exchange. As was successfully argued by a community of Drag artistes in the USA in 2014, just because an individual prefers to be represented online by a pseudonym such as ‘Lil Miss Hot Mess’ does not mean that they are a potential threat to the network, they may merely be exerting their right of freedom of expression (Lingel & Golub, 2015). As is often the case in research on social interactions there is not necessarily a clear-cut answer.

The non-significant predictive association between network outliers and negative online experiences also did not support the hypotheses. These findings call into question prior research which had suggested that unconnected individuals in a network would increase tension and vulnerability due to the low social and reputational costs of their potential exchanges online (Brass et al., 1998). Whilst correlational analysis did provide minor evidence for this theoretical standpoint, the lack of predictive significance suggested that network outliers might not necessarily constitute a potential online vulnerability in all networks. For some, connecting to diverse and unconnected individuals might provide a useful source of social capital (Ellison et al., 2007), providing informational, social support, and/or even reputational support.

The non-significance of gender-hidden, pseudonym, and outlier profiles raises an important issue in respect of the methods of analysis and data collection adopted by this research. The present chapter relies on the researcher’s identification of non-standard characteristics based on text-based network information. While this provides a good indication of the presence of non-standard profile characteristics in a network, it cannot readily assume the context in which these non-standard profiles have been

friended. It is quite plausible that a profile displaying such non-standard characteristics might be known to the SNS user and may even be a strong tie. Therefore, to provide a more informed perspective of the role individual contacts might play in a network, contextual information from the perspective of the SNS user is required. Chapter 9 will combine both network information and SNS user reports pertinent to individuals on their networks to gain a better understanding of the characteristics of the online connections and their potential involvement in negative online experiences.

To conclude, the results presented in this chapter provide an interesting and original indication of the potential role of non-standard profile characteristics in an individual's susceptibility to negative online experiences. However, it should be noted that the present analysis provides a cross-sectional snapshot of only 177 users, from a non-representative sample (see Chapter 3, Section 3.4.4, p.112, for a discussion of the sample limitations). Ego-centric online SNS have amassed global participation numbering in the billions. In an era of Big Data, access to large digitally derived datasets from social networking sites has the potential to provide a new insight into the ways in which researchers perceive social phenomenon (boyd & Crawford, 2012). Indeed, the analysis presented in this chapter has demonstrated the explanatory power that digital data can hold in allowing us to identify potentially nefarious network contacts. It should be noted, however, that the erroneous profiles described in this chapter constitute only approximately 2% of all network contacts (Facebook, 2015). This leaves a large proportion of an individual's connections unaccounted for. While, Big Data may deliver opportunities for researchers to access details of the other 98% of connections, in terms of both their user demographics and online activities (Rieder, 2013) when viewed out of context, the data cannot readily provide an insight into the perceived psychological impact that such online social interactions might have on the

user (boyd & Crawford, 2012). Further investigation is therefore needed to test the extent to which digitally derived data can be used to identify problematic individuals amongst these connections. This is explored further in Chapter 9.

## **Chapter 9: Online friending: Characteristics and consequences of online troublemakers.**

### *9.1 Chapter introduction*

The present chapter provides a final set of analyses, which considers the characteristics of both the SNS users and the online connections who might be involved in potentially vulnerable online networks. In previous literature, characterising troublemakers has largely relied on self-reports, often considering the role of network connections from an indirect perspective (e.g., Betts, Gkimitzoudis, & Baguley, 2017; Ybarra & Mitchell, 2004). The identification of network contacts that violate socially acceptable behaviour is vital for supporting preventative strategies for undesirable, psychologically damaging online interactions. The present thesis has demonstrated in Chapters 7 and 8, how the number and diversity of contacts present in an individual's online network might be associated with reported rates of negative online experiences. Furthermore, an appraisal of digitally derived data (see Chapter 8, p. 268), demonstrated an association between specific forms of non-standard profile connections (e.g., misclassified profiles) and potentially problematic online experiences. The present chapter extends our understanding of the role of online connections by widening the scope of user characteristics to consider demographic, psycho-social characteristics, behavioural and network characteristics. In doing so, the chapter provides further evidence for RQ1, RQ4, and RQ5 by testing the extent to which a combination of digitally derived and self-reported data can be used to identify specific user characteristics of those involved in potentially problematic online networks.

It should be noted that sections of the introduction, analyses, and discussion presented in Chapter 9 are partly presented in/based on an article published in Buglass et al., 2017b (see Appendix 9 for further details).

## *9.2 Hypothesised model*

SNS, such as Facebook, offer guidance regarding what is deemed appropriate online behaviour and content (Facebook, 2016), violations of which can result in suspension from the network. However, what individual users deem to be acceptable differs not only from individual to individual, but also between networks (Fox & Moreland, 2015), making the identification of potential online victims and troublemakers fraught with complexity.

Attempts to identify the characteristics of likely online victims and also troublemakers have been discussed extensively in the cyber-bullying and harassment literature (Betts et al., 2017; Kokkinos, Baltzidis, & Xynogala, 2016; Pabian, De Backer, & Vandebosch, 2015; Ybarra & Mitchell, 2004), but an over-reliance on ego-centred data has often seen the role of ‘friends’ considered from an indirect perspective. In addition, a reliance on purely self-reported perspectives of online relationships and characteristics of friend networks inevitably raise the question of social desirability and impression management by users. As demonstrated in the previous empirical chapters, the combination of structural (digitally derived) and social (self-reported) characteristics of both the network holders and their connections can contribute to an understanding of vulnerability towards negative online experiences. The present analyses examine how such characteristics provide a means of identifying individuals who are at risk of such vulnerability and those connections who might be perceived to provide this risk. To this end, a multi-level approach that allows for the appropriate statistical modelling of such novel combined user and network data is presented.

The focus of the analyses is on ‘friend’-based networks, i.e., on online connections that have been mutually agreed between two users. While there are numerous other instances of severe online disagreements and clashes between unknown parties, such as trolling (Coles & West, 2016), mutually agreed contacts are relevant for several reasons. They form networks that most users will feel are essential for their day-to-day socialising and therefore imply routine online connectivity. As previously shown in chapters 7 and 8, such networks have been found to contain a wider variety of contacts, not all of which are well known or close to a user in an offline or online context. As a consequence, the generation of disagreement has previously been identified as a side effect of SNS use due to the collapse of established spatial and temporal boundaries (Binder et al., 2012). The present chapter furthers the understanding of such perceived network disagreements, by not only establishing their perceived existence on the networks sampled, but also the characteristics of the individuals involved in those networks, in terms of both the network holder and their online connections.

The research questions to be addressed in this chapter are:

*RQ1: Does FOMO influence an SNS user’s reported exposure to negative online experiences?*

*RQ4: Does the accumulation of large, diverse online networks influence the reported rate of negative experiences online?*

*RQ5: Are certain user and/or network characteristics more likely to influence an SNS user’s perception of and/or reported exposure to negative online experiences?*

To address these questions five hypotheses will be tested, using multi-level modelling methods (see Figure 9.1):

*H1.1 Individuals with higher levels of FOMO will report higher levels of exposure to negative online experiences.*

*H4.1 Digitally reported network size will positively predict exposure to negative online experiences.*

*H5.1 The age and gender of SNS users will influence the reported level of exposure to negative online experiences.*

*H5.6 Individuals will attribute higher levels of negative online experiences to interactions with significant known individuals.*

*H5.7 An individual's offline interactions with an online connection will influence the relationship between Facebook interactions and reported instances of negative online experiences.*

*H5.8 Individuals who connect to socially popular others online will report higher levels of exposure to negative online experiences.*



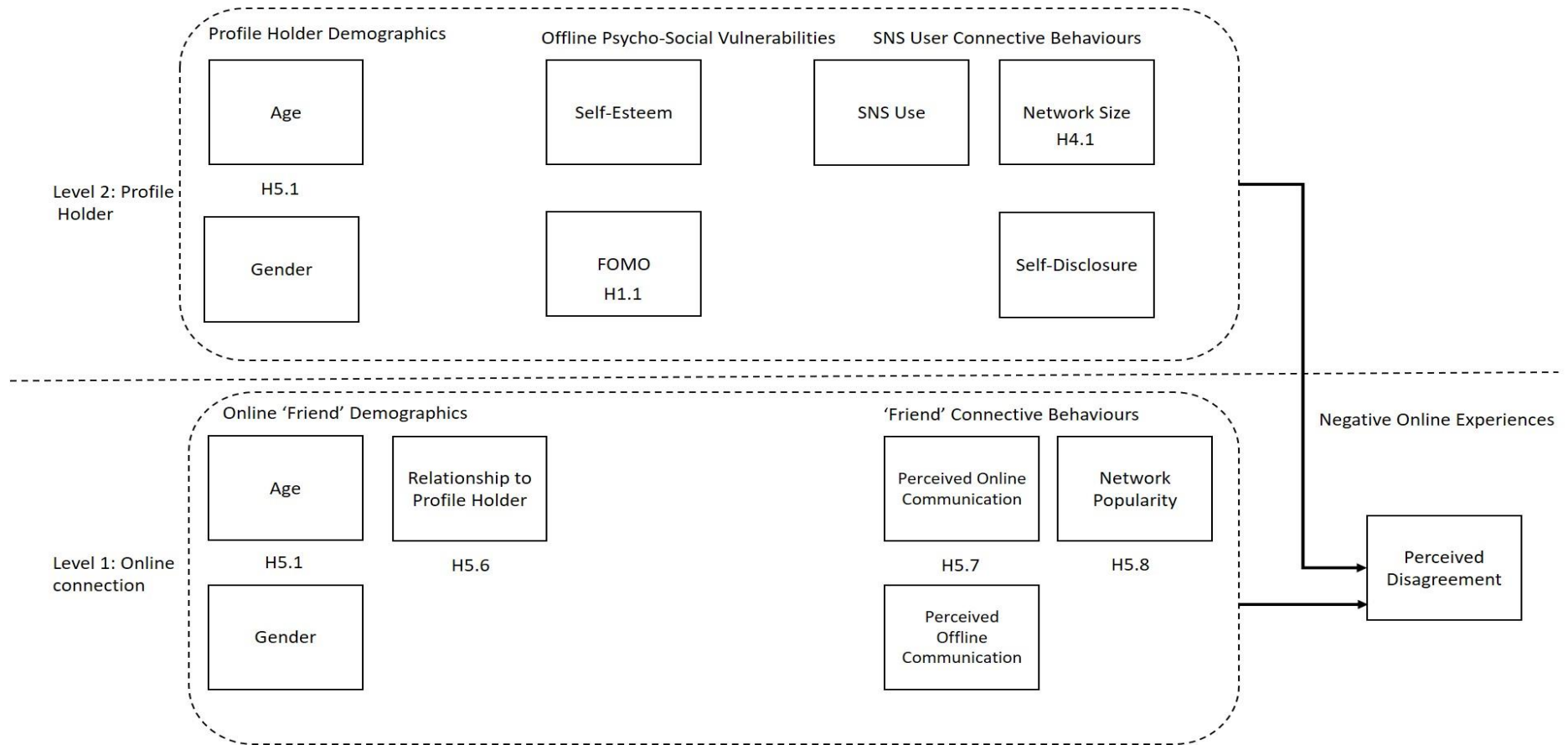


Figure 9.1: Hypothesised multi-level model of the associations between SNS user characteristics, online connection characteristics (actual and perceived) and perceived negative online experiences involving the online connection.

### *9.3 Theoretical background*

Online SNS provide a platform for users to create personal networks, in which the network holder (the ego) connects with other users (alters) from both offline and online social spheres via a process of online ‘friending’ (Arnaboldi et al., 2013). Concerns have been raised about the detrimental impact of encountering troublemakers on SNS (Debatin, et al., 2009). Troublemakers, contacts who are involved in a range of social disturbances ranging from social blunders to damaging gossip, provide a source of tension that promotes undesirable and potentially psychologically damaging interactions in both online domains (Binder et al., 2012; Debatin et al., 2009) and in offline social situations (e.g., schoolyard bullying) which ultimately might transfer online (Kwan & Skoric, 2013). The focus in the present analyses is on identifying characteristics of these potential troublemakers and the networks on which they reside. Factors including online SNS network size, demographics of the SNS user, and their connections, network popularity, and communication rates (both online and offline) are discussed.

Psycho-social vulnerability has been shown to affect the rate at which SNS users report instances of negative online experiences (Forest & Wood, 2012; Lee et al., 2012). Indeed, the present thesis has demonstrated in previous chapters (see Chapters 4 (p.179) and 5 (p. 202)) how lower levels of self-esteem and higher levels of FOMO are seemingly associated with higher self-reported levels of negative online experiences. The current study will seek to further test the extent to which these offline psycho-social vulnerabilities might help to explain a user’s likelihood of reporting perceived instances of negative online experiences (RQ1: H1.1).

For many users, online SNS provide a means of maintaining pre-existing offline relationships (Ellison et al., 2007) with significant individuals, past and present. With

the average network size now routinely numbering upwards of 155 (as a conservative estimate; see Best, Taylor, & Manktelow, 2015; Dunbar, 2016; Pew Research, 2014), these networks are increasingly being used to maintain online connections with not just close offline associates (e.g., family, friends) but also a diverse array of individuals and even the loosest of social connections (Binder et al., 2012) that an individual might encounter in their daily lives (e.g., classmates, colleagues) and/or engage in loose interactions both online and offline (e.g., friends of friends and online only friends). While these associates may not be well-known to the individual, the routine connectivity that they have with such contacts (offline and/or online) is likely to illicit a level of social acceptance, closeness, and disclosure (on the part of both the individual and the connection) whereby sharing information via an SNS is deemed an appropriate means of interaction.

In the offline world, associating with individuals from a wide array of different social spheres, may not be overly problematic, as individuals can generally moderate the disclosures they make to suit the separate contexts of their connections (Vitak, 2012). However, large, socially diverse online networks increase the risk potential as the mingling of different social spheres in one contextual domain presents the SNS user and their network connections with a melting pot of differing social norms and expectations which are ripe for violation (McLaughlin & Vitak, 2012; Vitak, 2012). In this context, appropriateness of comment and content (i.e., self-disclosure and profile information) can provide a source of online tension and disagreement (Fox & Moreland, 2015), which may ultimately impinge on the reputational and psychological wellbeing of the individuals in the network. The present thesis has previously demonstrated a potential association between online network size and self-disclosure on reported rates of negative online experiences (see Chapters 4 (p.179) and 7 (p.249)).

The current study will seek to further test the role of such network characteristics (RQ4: H4.1).

Some 13 – 15% of online users' report being the target of negative online behaviour (Lenhart et al., 2011). Reporting of these experiences is more prominent amongst females. A review study by Jones et al. (2013) found that the overall rate of females reporting online harassment had significantly increased, over that of reporting from males, in a ten-year period. Furthermore, increased rates of reporting have also been observed amongst adolescents and young adults (Annenberg Public Policy Centre, 2010; Sengupta & Chaudhuri, 2011). In contrast, studies offering demographics of troublemakers have indicated that males are marginally more likely to cause problems online than females (Aricak et al., 2008), especially during the transition from adolescence to adulthood (Annenberg Public Policy Centre, 2010).

The potential role of age, might be linked to changes in autonomy and connectedness that individuals experience across the different life stages (Nock & Buhl, 2005). As individuals move from adolescence to adulthood individuals tend to be party to various new social experiences such as leaving home, attending university and eventually entering the world of work (Arnett, 2007). As such, young adults might be more likely to associate with newfound connections from different backgrounds whom may or may not complement the social norms and expectations that they are used to. The current study sought to explore demographic (age and gender) attributes of both online connections and SNS users (RQ5: H5.1) to determine whether previous trends highlighted in the research will hold for the present sample. The testing of hypothesis H5.1 is consistent with the chapters previously presented in the current thesis.

From the perspective of the online connections, the present study also examined the degree to which potentially troublesome online connections could be viewed as socially competent individuals. Whilst troublesome behaviour might allude to social incompetency, a recent body of research has suggested that such individuals might in fact possess highly developed social skills that are being used to manipulate and control others (Arsenio & Lemerise, 2001; Volk, Dane, Marini, & Vaillancourt, 2015), in a bid to increase their social connectivity (Postigo et al., 2012). This means that troublesome contacts may actually come across as highly popular, holding central places in an ego-network with numerous connections to others (RQ5: H5.8).

For an online connection to be identified as a ‘troublemaker’ the SNS user needs to be aware of their negative online behaviour. Where a connection is socially popular on the network, the centrality of their position might render them more noticeable due to the SNS users being aware of not only interactions with themselves but also with a potentially larger proportion of their network. Both incidents directed at the SNS user or witnessed by the SNS user among online connections carry the potential of destabilising the network and increase the demands on the SNS user in terms of network management (Binder et al., 2012). Openly noticeable behaviours, such as using social media to insult or threaten, or posting inappropriate materials (Vandebosch & Van Cleemput, 2009), are most obvious to the SNS user if such incidents appear on their newsfeed or within private chat facilities.

On sites such as Facebook, users only automatically see a small percentage (20%) of the posts that have been made by their contacts each day (Time Online, 2015). Complex algorithms are employed to determine newsfeed salience on behalf of the users, taking into account their personal preferences and rate of online interaction. Online connections who do not engage with the SNS user on a regular basis are likely

to lose newsfeed prominence, and therefore their indiscretions may go unnoticed. For this reason, it may be logical to assume that for an SNS user to readily witness, or indeed be targeted by, such incidents, they must engage in some degree of Facebook communication with the online connections in question. The present thesis will test whether Facebook communication is a predictive characteristic of perceived problematic behaviour online.

Conversely, should online connections direct inappropriate behaviour towards a mutual 'friend' with whom the SNS user communicates online (e.g., posting a hurtful remark on a mutual friend's photograph), interactions between the mutual friend and the troublesome online connection may be visible via the SNS user's newsfeed. Negative impressions of the online connection will thus be formed without the need for direct online communication between the SNS user and troublesome online connection. Infrequent online communication with troublesome online connections would for many provide good grounds for 'unfriending'. However, this might not happen. Studies have suggested that individuals who experience negative online behaviour may know their perpetrators offline (Ybarra & Mitchell, 2004; Wolak et al., 2007). Therefore, factors such as the centrality (popularity) of the troublesome contact in the network and a desire for offline relationship preservation (Bevan, Pfyl, & Barclay, 2012; Bevan et al., 2014) might prevent SNS users from taking such direct action. Instead SNS users might simply avoid online interactions with the troublesome online connection.

While online communication patterns may affect the noticeability of perceived disagreements, the degree of acquaintance that an SNS user has with an online connection has the potential to influence how the SNS user ultimately interprets online connection behaviour on the network. When an online connection is known to the SNS

user in both online and offline contexts, their online actions are more likely to be judged according to norms of behaviour relating to offline social boundaries. Expectancy Violations Theory (EVT; Burgoon, 1993; McGlaughlin & Vitak, 2011) postulates that individuals will react differently to unexpected norm violations by others depending on their relationship with those involved.

A USA focus-group study by McGlaughlin and Vitak (2011), in which 26 participants discussed Facebook norms, indicated that negative behaviour attributed to significant connections routinely leads to direct confrontation amongst those involved in a bid to resolve conflict, preserve relationships, and communicate the norm expectations of the network to the perpetrator(s). Norm violations by significant others might be more salient to the ‘victim’ as the ‘troublemaker’ has crossed known and established relational boundaries. In contrast, negative behaviour exhibited by looser connections, such as acquaintances, often goes unchallenged (Fox & Moreland, 2015). On this basis, it is plausible that undesirable behaviour by online connections who are known to the SNS users offline (RQ5: H5.6) and communicate with them frequently in offline settings (RQ5: H5.7) might be more noticeable.

#### *9.4 Method*

The aim of these analyses was to identify factors related to SNS users’ perceptions of troublesome behaviour online. Specifically, the research sought to investigate the potential impact of a range of variables pertinent to both the SNS user (e.g., user demographics, psycho-social vulnerability (self-esteem and FOMO), and connective behaviours (SNS use, self-disclosure, profile data and network size)) and their online connections (e.g., connection demographics, relationship with SNS user, popularity (centrality) in the network, and perceived rate of communication) might have on a

SNS user's appraisal of potentially problematic individuals on their network. The SNS user and online connection characteristics discussed represented the predictor variables in the analysis, with perceived negative online experience (operationalised as perceived online disagreement) representing the outcome variable. It should be noted that not all disagreements are potentially negative (e.g., instances of friendly banter between colleagues; Plester & Sayers, 2007), however, for the purposes of this study all participants were provided with a definition of disagreement in terms of potentially unsociable and negative behaviour prior to completing the study. All measures and procedures have been previously outlined in Chapter 3 (Section 3.6.3, p.157).

Eligibility for this analysis was based on the individual SNS user's prior completion of an online social networking survey (see Chapter 3, Section 3.6.1, p.117) and submission of digital network data (see Chapter 3, Section 3.6.2, p.147). A sub-sample of 52 UK-based Facebook users ( $M = 21$  years 11 months,  $SD = 7$  years 8 months, 39 female, 13 male) participated in this analysis. The female skew was most likely a product of recruiting half of the participants ( $N = 24$ ) from a predominantly female university departmental pool. A sample of 5113 (53% female) online connections was derived from the networks of the 52 participants. In addition to the network appraisal task, all participants completed 8 open ended questions designed to provide a more in-depth overview of the sample. A full description of the sample used in this analysis can be found in Chapter 3 (see Section 3.6.3.1, p.158).

## 9.5 Results

Descriptive statistics and bivariate correlations for the main study variables are provided in Table 9.1.



*Table 9.1: Descriptive statistics and bivariate correlations for the main study variables (SNS User N = 52, Male = 13, Female = 39; Online Connection N = 5113; Male = 2346, Female = 2734; No gender specified: 33)*

	Mean	SD	Correlations													
			2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Disagreement	1.20	.61	-.092**	-.004	.132**	-.061**	.080**	.069**	.062**	-.051**	-.011	-.001	.001	.055**	.007	.093**
<i>SNS user</i>																
2 Age-Group	1.73	1.06		.018	-.122**	-.007	-.044**	.080**	-.032	.708**	.010	.037**	-.046**	-.050**	.054**	-.452**
3 Gender	1.05	.68			-.085**	-.284**	.091**	.069**	.175**	.004	.115**	.009	-.001	.034	-.013	-.065**
4 Network size	.76	.43				-.142**	-.103**	.321**	-.280**	.131**	.048**	.152**	.263**	.134**	.255**	.106**
5 Self Esteem	2.18	.44					.381**	.087**	.141***	.041**	.016	-.046**	-.119**	-.080**	-	-.122**
6 FOMO	2.21	.77						.247**	.174**	.021	-.044**	-.108**	-.078**	-.141**	-	-.076**
7 Self Disclosure	1.99	.61							-.206**	-.015	.048**	.051**	.149**	.004	.087**	.091**
8 Profile Data	9.75	2.87								-.055**	-.064**	-.046**	-.104**	-.164**	-.019	-.149**
<i>Online connections</i>																
9 Age-Group	2.71	1.25									.015	.154**	.050**	.063**	.177**	-.379**
10 Gender	.54	.50										.055**	.076**	.069**	.053**	.037**

11 Relationship Type	2.03	.81			.439**	.369**	.490**	.042**
12 Facebook	1.70	.94				.604**	.679**	.064**
13 Offline	1.77	1.07					.642**	.092**
14 Closeness	2.16	.99						.046**
15 Popularity	14.91	15.56						

*d.f. = 5078, \*\* $p < .001$ ; SNS User gender coded as 0 for male, 1 for female; Online connection gender coded as 1 for male, 2 for female and 0 for No Gender; SNS User Age-Group coded 0 for under 16; 1 for older adolescent (16 – 18 years); 2 for emerging adult (19 – 21 years) and 3 for adult (22 years +); Online connection Age-Group coded as 0 for don't know; 1 for under 16's; 2 for older adolescents (16-18 years); 3 for emerging adults (18 – 21 years); and 4 for adults (over 22 years). Online connection relationship coded as 0 for present significant connections, 1 for past significant connections and 2 for loose connections.*

Considering the methods and sites used to recruit the participant sample, it was not a surprise that older adolescents and emerging adults were the most prominent age-groups in both the SNS user ( $M = 1.73$ ,  $SD = 1.06$ ) and online connection ( $M = 2.71$ ,  $SD = 1.25$ ) samples. Age-groups of both samples were highly correlated,  $r = .71$ ,  $p < .001$ , indicating that SNS users tended to hold networks of similarly aged online connections. SNS user age was negatively correlated with SNS user network size,  $r = -.12$ ,  $p < .001$ , suggesting that network size was lower amongst the older SNS users.

In terms of SNS user to online connection relationships ( $M = 2.03$ ,  $SD = .81$ ) the online connection sample was distributed quite evenly, with approximately a third of all online connections being attributed to each category (loose, significant past, significant present). The network popularity (an adapted measure of centrality in the network, see Chapter 3, Section 3.6.3.3.2, p.162) of the online connections ranged from 0 (network isolate) to 86.78%, with a mean of 14.85% ( $SD = 15.54\%$ ). This indicated that the average Facebook ‘friend’ was connected to approximately 16% of all the online connections on their respective SNS user network.

Rate of SNS user to online connection communication was generally low for both Facebook communication ( $M = 1.70$ ,  $SD = .94$ ) and offline communication ( $M = 1.77$ ,  $SD = 1.07$ ). Frequency data for both forms of SNS user to online connection communication indicated that approximately 80% ( $N = 4090$ ) of the Facebook ‘friends’ had little or no communication with their respective SNS users. Perceived closeness to the online connections was also generally low ( $M = 2.16$ ,  $SD = .99$ ), with 72% ( $N = 3681$ ) of the Facebook ‘friends’ being rated as not being close to their respective SNS users.

As previously described in Chapter 3 (Section 3.6.3.3.1, p.161), participants rated the frequency which they experienced perceived online disagreement with each online connection sampled from their network, on a scale of 1 (*Never*) to 5 (*Very Often*). The mean level of perceived network disagreement across the online connection sample was low ( $M = 1.20$ ,  $SD = .61$ ). Bivariate correlations (see Table 9.1, p.296) were used to test for associations between the measure of perceived disagreement and other main study variables. To avoid potential p-value distortion (Lin, Lucas, & Shmueli, 2013) due to the large sample size at the level of online connections ( $df = 5078$ ), only bivariate correlations at  $p < .001$  are highlighted in the analyses.

Perception of online disagreement with a connection was significantly correlated with a number of variables specific to the SNS user (ego), including SNS user age-group,  $r = -.10$ ,  $p < .001$ , network size,  $r = .13$ ,  $p < .001$ , self-esteem,  $r = .06$ ,  $p < .001$ , FOMO,  $r = .08$ ,  $p < .001$ , self-disclosure,  $r = .07$ ,  $p < .001$ , and level of profile data disclosed,  $r = .06$ ,  $p < .001$ . Furthermore, ratings of perceived disagreement were also associated with variables specific to the online connections, including age-group,  $r = -.05$ ,  $p < .001$ , offline communication,  $r = .06$ ,  $p < .001$  and network popularity (centrality),  $r = .09$ ,  $p < .001$ . In terms of the SNS users, this indicated that there might be an association between higher levels of perceived disagreement and younger, psychologically vulnerable SNS users, those who disclosed at higher rates, and also SNS users with larger networks. For online connections, consistent with hypothesised predictions, the correlations indication a possible association between higher levels of perceived disagreement and online connections who were in the younger or unknown age categories, in offline contact with the SNS user, and/or relatively popular (central) on the SNS user network.

### *9.5.1 Descriptive overview of network troublemakers*

A frequency of perceived disagreement rated above 1 (*Never*) on the perceived online disagreement scale, is indicative of some degree of perceived negative online experience between the individual online connection and the SNS user. To gain a more informative descriptive overview of the connections deemed to be ‘troublesome’, the perceived disagreement ratings were recoded to a binary variable where a score of 1 (*Never*) equalled 0 (no perceived disagreement), and scores from 2 (*Not very often*) – 5 (*Very often*) were recoded as 1 (perceived disagreement reported). This rendered a troublesome sub-sample with 617 (12%) of the total 5113 online connections identified as perceived network troublemakers. Whilst this is a low proportion of the overall sample, it does complement previous research reporting rates of online troublemakers (Lenhart et al., 2011). Therefore, it was not an unexpected finding, as for selective online ‘friend’ based networks to remain a popular pastime, they would not routinely be expected to harbour large numbers of troublesome individuals. The online connection characteristics of the 617 network ‘troublemakers’ can be found in Table 9.2.

*Table 9.2: Descriptive characteristics of perceived network ‘troublemakers’ (N = 617; Male = 309; Female = 308)*

	Mean (SD)	Range	Frequency Data (%)				
Gender			Male	Female	Unknown		
			309 (50.1)	308 (49.9)	0 (0.0)		
Age-Group			Don’t Know	Under 16	16-18 years	EA	Adult
			18 (2.9)	39 (6.3)	232 (37.6)	221 (35.8)	107 (17.3)
Relationship Type			Loose	Past Significant	Present Significant		
			168 (27.2)	237 (38.4)	212 (34.4)		
Facebook Communication	1.75 (.95)	1 – 5	1 Never	2	3	4	5 Daily
			333 (54.0)	149 (24.1)	99 (16.0)	31 (5.0)	5 (0.8)
Offline Communication	1.95 (1.13)	1 – 5	1 Never	2	3	4	5 Daily
			295 (47.8)	149 (24.1)	105 (17.0)	45 (7.3)	23 (3.7)
Closeness	2.24 (1.09)	1 – 5	1 Not at all close	2	3	4	5 Very Close
			169 (27.4)	242 (39.2)	118 (19.1)	62 (10.0)	26 (4.2)
Popularity <sup>2</sup>	19.51 (15.77)	0 – 67.87					

*EA = Emerging adult*

Identified in 37 of the 52 SNS user networks (9 male, 28 female), only 26 (4%) of the 617 (309 male, 308 female) disagreeable online connections were from adult SNS user networks, the vast majority ( $N = 493$ ) of disagreement being identified in networks of

<sup>2</sup> Popularity (a form of centrality) is a digitally derived, continuous network variable, therefore, no frequency data is provided.

emerging adult SNS users. The majority (73.4%) of the troublemakers identified were between the ages of 16 and 21 years of age. Younger connections being rated disagreeable with greater frequency could indicate a lack of social skills on the part of the SNS user and/or younger connections, due their age and experience. This would complement research into risk taking behaviour and peer relationships in both the online and offline world (Álvarez-García, Pérez, González, & Pérez, 2017; Valkenburg & Peter, 2011). Therefore, when considering the younger age demographic of the SNS user sample, it is probably not surprising that these networks might be more likely to contain individuals perceived to be misbehaving in an online context.

The proportion of disagreeable online connections present in larger networks (networks with over 633 connections) was 21.0% ( $N = 271$ ), compared to approximately 10% of online connections in networks of medium ( $N = 254$ ) and low sizes ( $N = 92$ ). A z-score comparison indicated that larger networks harboured a significantly higher proportion of disagreeable online connections than both medium,  $z = 9.76, p < .05$ , and low sized networks,  $z = 12.31, p < .05$ . Seventy-three percent of the disagreeable online connections had a significant connection (either past or present) with the SNS users ( $N = 449$ ). A comparison of z-scores indicated that overall the proportion of significant past disagreeable connections was higher than disagreeable loose connections,  $z = 2.58, p < .05$ .

To explore the role of connective relationships further, the number of disagreeable online connections from specific social spheres was considered (Table 9.3).

*Table 9.3: Frequency, communication rate, and closeness of disagreeable online connections (N = 617; Male = 309, Female = 308)*

	Disagreeable Alters (% Total Alter Frequency)	Offline Communication M (SD)	Facebook Communication M (SD)	Closeness M (SD)
Present Significant Connection	212 (12.1)	2.66 (1.23)	2.34 (1.08)	2.99 (1.11)
Parent	2 (10.0)	4.50 (.71)	3.50 (.71)	5.00 (.00)
Child	0 (0)	.	.	.
Spouse/Partner	0 (0)	.	.	.
Sibling	2 (11.1)	2.50 (.71)	3.50 (.71)	4.00 (1.41)
Grandparent	0 (0)	.	.	.
Other Family	22 (12.6)	2.45 (.80)	2.77 (.97)	3.41 (.96)
Best Friend	18 (20.0)	3.50 (.92)	3.78 (.73)	4.67 (.49)
Friend	88 (11.2)	2.39 (1.11)	2.06 (.97)	2.85 (.97)
Teacher (Present)	1 (7.0)	4.00 (.00)	4.00 (.00)	4.00 (.00)
Classmate (Present)	34 (12.6)	3.24 (1.50)	2.32 (1.09)	2.85 (1.02)
Co-worker (Present)	16 (14.5)	3.12 (1.02)	2.25 (.86)	2.75 (1.00)
Neighbour	8 (32.0)	2.50 (1.69)	1.50 (.76)	2.00 (.76)



Interest Group Member	21 (9.5)	1.86 (.96)	1.95 (.86)	2.15 (.65)
Student	0 (0)	.	.	.
Past Significant Connection	237 (13.3%)	1.51 (.78)	1.47 (.72)	1.98 (.86)
Teacher (Past)	1 (16.7)	1.00 (.00)	5.00 (.00)	2.00 (.00)
Classmate (Past)	227 (15.1)	1.51 (.79)	1.43 (.66)	1.96 (.83)
Co-worker (Past)	1 (<1.0)	3.00 (.00)	3.00 (.00)	3.00 (.00)
Childhood Friend	6 (<.10)	1.50 (.55)	1.83 (.98)	2.83 (1.47)
Ex-Partner	2 (25.0)	1.50 (.71)	2.00 (.00)	2.00 (.00)
Loose Connection	168 (10.5)	1.67 (.96)	1.38 (.68)	1.67 (.81)
Friend of Friend	89 (14.9)	1.66 (.82)	1.55 (.77)	1.88 (.91)
Casual Acquaintance	62 (10.6)	1.82 (1.18)	1.13 (.42)	1.50 (.59)
Online Only Friend	1 (<1.0)	1.00 (.00)	1.00 (.00)	1.00 (.00)
Celebrity / Public Figure	0 (0)	.	.	.
Other	6 (<1.0)	1.33 (.52)	2.00 (.89)	1.67 (.82)
Don't Know	10 (<1.0)	1.00 (.00)	1.10 (.32)	1.00 (.00)

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Chi-square analysis indicated that the percentage of disagreeable online connections in each relationship group did differ by specific social sphere,  $\chi^2(38, N = 617) =$

1234.00,  $p < .001$ . In the significant present group ( $N = 212$ ), only 28 disagreeable connections were family members. In contrast, 106 were friends with the SNS users and 78 were in more routine day-to-day relationships. Of these routine relationships, 34 were present classmates, 16 present co-workers, and 21 interest group members. From the significant past group ( $N = 237$ ), the majority of disagreeable connections were past classmates ( $N = 227$ ), representing connections who were once routine associates of the SNS users in the offline world. In the loose connections group ( $N = 168$ ), friends of friends ( $N = 89$ ), and casual acquaintances ( $N = 62$ ) accounted for a large proportion of the disagreeable online connections.

#### *9.5.2 Testing for differences in popularity, communication and closeness*

SNS user communication with perceived disagreeable ‘friends’ was low on Facebook ( $M = 1.75$ ,  $SD = .95$ ) and offline ( $M = 1.95$ ,  $SD = 1.13$ ), with approximately 67% ( $N = 411$ ) of the disagreeable ‘friends’ rated as being not close ( $M = 2.24$ ,  $SD = 1.09$ ) to their respective SNS users. Furthermore, disagreeable online connections ranged in network popularity (centrality) in terms of the respective SNS user networks, from 0 to 67.87%. The mean ‘friend’ popularity was 19.51% ( $SD = 15.77\%$ ), this was indicative of an average disagreeable ‘friend’ being connected to approximately one fifth of network connections on a network.

To test for mean differences in SNS user ratings of popularity, communication, and closeness, between those deemed to be troublemakers ( $N = 617$ ; popularity ( $M = 19.51$ ,  $SD = 15.77$ ), offline communication ( $M = 1.95$ ,  $SD = 1.13$ ), Facebook communication ( $M = 1.75$ ,  $SD = .95$ ), and closeness ( $M = 2.24$ ,  $SD = 1.09$ )) versus those rated as non-troublemakers ( $N = 4496$ , popularity ( $M = 14.21$ ,  $SD = 15.40$ ), offline communication ( $M = 1.74$ ,  $SD = 1.07$ ), Facebook communication ( $M = 1.70$ ,  $SD = .94$ ), and closeness

( $M = 2.15$ ,  $SD = .98$ )), a one-way ANOVA was conducted. Despite the unequal sample size, tests of data normality and homogeneity of variance were acceptable. Significant differences in network popularity (centrality),  $F(1, 5109) = 63.76$ ,  $p < .001$ , offline communication,  $F(1, 5109) = 20.13$ ,  $p < .001$ , and closeness,  $F(1, 5109) = 5.09$ ,  $p = .02$ , were evident. This indicated that online troublemakers were likely to be more popular on the SNS user networks (i.e., they were connected to more individuals), perceived to communicate with the SNS users on a more frequent basis offline and be perceived to be closer than individuals rated as non-problematic. Differences in Facebook communication were not significant,  $p > .05$ .

Mean rates of perceived online and offline communication and perceived closeness were also tested in terms of disagreeable connections identified by relationship group and specific social sphere. Relationship types with less than 2 cases were excluded from the analysis. Troublesome current significant connections were perceived to communicate offline,  $F(2, 614) = 82.68$ ,  $p < .001$ ;  $M = 2.66$ ,  $SD = 1.23$ ;  $p < .001$ , on Facebook,  $F(2, 614) = 80.50$ ,  $p < .001$ ;  $M = 2.34$ ,  $SD = 1.07$ ;  $p < .001$ , and were perceived to be closer to the SNS user,  $F(2, 614) = 106.95$ ,  $p < .001$ ;  $M = 2.99$ ,  $SD = 1.11$ ;  $p < .001$ , than online connections in the past significant (offline ( $M = 1.51$ ,  $SD = .78$ ), Facebook ( $M = 1.47$ ,  $SD = .72$ ), closeness ( $M = 1.98$ ,  $SD = .86$ )) and loose ((offline ( $M = 1.67$ ,  $SD = .96$ ), Facebook ( $M = 1.38$ ,  $SD = .68$ ), closeness ( $M = 1.67$ ,  $SD = .81$ )) connection groups.

Of the troublesome current significant contacts, parents, best friends, friends, classmates, and co-workers were found to have significantly higher rates of perceived offline communication with the SNS user,  $p < .05$ . Troublesome connections with a familial connection and best friends were perceived to be significantly closer to the SNS user,  $p < .01$ . Troublesome parents, siblings, and best friends were perceived to

communicate on Facebook significantly more with the SNS users than significant connections from other more routine social spheres (e.g., classmates, co-workers),  $p < .05$ .

To further test the role of disagreeable characteristics in potentially vulnerable networks, these and the other SNS user and online connection variables measured in this chapter, were entered into a series of multilevel models.

### *9.5.3 Multilevel analyses*

The hierarchical structure of the network appraisal data (5113 online connections in 52 SNS user networks) lent itself to multilevel modelling. For this analysis, two-level binary logit models were used. Analysis of the dataset was conducted using MLWin V2.33 (Browne et al., 2000) and the MCMC estimation method with chain length of 15000 iterations (Browne & Rasbash, 2009). All continuous variables included in the analysis were grand mean centred in order to maximise model stability (Kreft & deLeeuw, 1998).

In standard multilevel linear regression, comparison between different models can be made through the consideration of variance components. However, in logit-based multilevel logistic regression models, such as those discussed here, these comparisons are rendered inappropriate due to a rescaling of the model coefficients and variance components (Hox, 2010). Pseudo  $R^2$  statistics can be used as a possible means of comparing the substantive worth of the models. However, they are prone to underestimation and unlike traditional measures of  $R^2$  do not provide a means of adequately assessing the variance explained (Hox, 2010). In this analysis, comparisons between the models were made using the Cox and Snell  $R^2$  with Nagelkerke (1991)

adjustment (to correct the upper bound limit to 1), with higher  $R^2$  values indicating a more preferable model. In addition, a further mode of comparison, the *DIC* (Deviance Information Criterion), a goodness of fit statistic (Browne & Rasbash, 2009), was calculated for each model. Decreases in *DIC* values between models of more than 5 points indicate a better model fit to the data (MRC, 2015).

Random intercept models tested perceived disagreement as the outcome variable, online connection data (age-group, gender, relationship type, Facebook communication, offline communication, closeness, and popularity) as level 1 variables and SNS user data (age-group; gender, self-esteem, FOMO, SNS use, self-disclosure (operationalised as both self-disclosure and profile data), and network size) as level 2 variables. A level 1 interaction term between offline communication and Facebook communication was also tested. Level 1 variables (age-group, relationship type, Facebook communication, offline communication, and closeness) were derived from the participant's (the SNS user) perceptions of the online connection based on their interactions with them in online and offline domains. The level 1 variables gender and popularity (centrality) were derived from digital data. Despite being reported by the participant, the level 1 variables were specific to individual online connections identified in the SNS user's network, they therefore qualified as characteristics pertinent to the individual connection (level 1), not the overarching SNS user (level 2).

The models illustrate the role of all tested predictors, irrespective of significance. An initial comparison of the *DIC* scores between a two-level null model (Model 1) and a single level model of the dataset indicated that the two-level model ( $DIC = 3060.46$ ) provided a substantially better fit than the single-level model ( $DIC = 3767.91$ ). Additionally, significant between-SNS user variance,  $\sigma^2_{u0} = 3.25$ ,  $SE = .74$ ,  $p < .001$ ,

indicated that the occurrence of perceived network disagreement varied significantly between SNS users. A *VPC* (variance partition coefficient) of .49, calculated using the approach by Snijders and Bosker (1999; see also Goldstein, Browne, & Rasbash, 2002) indicated that both SNS user and online connection levels played an equal role in predicting online disagreement. This combined evidence suggested that the 2-level model (Deviance = 3016.12, SE = 44.34) was a more appropriate fit for the data and provided good grounds for further multilevel investigation.

Results from the binary logistic random intercept multilevel models are presented in Table 9.4.

Table 9.4: Multilevel models of network disagreement (SNS User  $N = 52$ ; Online Connection  $N = 5113$ )

	Model 2				Model 3				Model 4				Model 5			
	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P
Intercept	-4.34 (.41)	111.25**			-4.34 (.44)	99.70**			-4.22 (.45)	81.58**			-5.32 (.73)	53.62**		
<i>Online Connections</i>																
Gender (Female)	-.19 (.10)	4.06*	.83 [.68, 1.01]	.45	-.21 (.10)	4.90*	.81 [.67, .99]	.45	-.23 (.10)	5.52*	.79 [.65, .97]	.44	-.24 (.10)	5.94*	.79 [.65, .96]	.44
Age (Under 16)	1.46 (.38)	14.51**	4.31 [2.04, 9.07]	.81	1.46 (.39)	14.51**	4.31 [2.00, 9.25]	.81	1.37 (.39)	12.53**	3.94 [1.83, 8.45]	.80	1.42 (.42)	11.35**	4.14 [1.82, 9.42]	.81
Age (Older Adolescent)	1.19 (.30)	15.56**	3.29 [1.83, 5.92]	.77	1.24 (.28)	19.06**	3.46 [2.00, 5.98]	.78	1.17 (.29)	16.06**	3.22 [1.83, 5.69]	.76	1.20 (.33)	13.41**	3.32 [1.74, 6.34]	.77
Age (Emerging Adult)	1.22 (.30)	17.08**	3.39 [1.88, 6.10]	.77	1.28 (.27)	21.87**	3.60 [2.12, 6.11]	.78	1.21 (.29)	17.34**	3.35 [1.90, 5.92]	.77	1.21 (.33)	13.61**	3.35 [1.76, 6.40]	.77
Age (Adult)	1.53 (.33)	21.89**	4.62 [2.42, 8.82]	.82	1.60 (.31)	26.47**	4.95 [2.70, 9.09]	.83	1.45 (.32)	19.95**	4.26 [2.28, 7.98]	.81	1.55 (.35)	19.97**	4.71 [2.37, 9.36]	.82
Network Popularity	.03 (.00)	40.39**	1.03 [1.03, 1.03]	.51	.03 (.004)	45.14**	1.03 [1.02, 1.04]	.51	.03 (.00)	45.01**	1.03 [1.03, 1.03]	.51	.03 (.00)	46.62**	1.03 [1.03, 1.03]	.51

	Model 2				Model 3				Model 4				Model 5			
	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P
Connection (Past Significant)	-.09(.14)	.36	.91 [.69, 1.20]	.48	-.07 (.14)	.31	.93 [.71, 1.23]	.48	-.08 (.14)	.33	.92 [.70, 1.21]	.48	-.09 (.15)	.40	.91 [.68, 1.23]	.48
Connection (Present Significant)	.16 (.15)	1.18	1.17 [.87, 1.57]	.54	.10 (.15)	.34	1.11 [.82, 1.48]	.52	.08 (.15)	.31	1.08 [.81, 1.45]	.52	.10 (.16)	.38	1.11 [.81, 1.51]	.52
Facebook Communication	-.02 (.08)	.10	.98 [.84, 1.15]	.50	-.08 (.08)	.94	.92 [.79, 1.08]	.48	.15 (.09)	2.98	1.16 [0.97, 1.38]	.54	.16 (.09)	3.63	1.17 [.98, 1.40]	.54
Offline Communication					.18 (.07)	5.45*	1.20 [1.04, 1.37]	.57	.27 (.08)	14.42**	1.31 [1.12, 1.53]	.57	.28 (.08)	13.12**	1.33 [1.13, 1.55]	.57
Closeness	.18 (.07)	6.15*	1.20 [1.04, 1.37]	.54	.09 (.08)	1.13	1.09 [.94, 1.28]	.52	.04 (.08)	.29	1.04 [.89, 1.22]	.51	.03 (.04)	.10	1.03 [.95, 1.11]	.51
Facebook Comms * Offline Comms									-.24 (.05)	29.73**	.79 [.71, .87]	.44	-.24 (.04)	30.08**	0.79 [.73, .85]	.44



	Model 2				Model 3				Model 4				Model 5			
	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P
<i>SNS user Level Variables</i>																
Female	.	.	.	.	.	.	.	.	.	.	.	.	.57 (.64)	.81	1.77 [.50, 6.20]	.91
Age (Emerging Adult)	.	.	.	.	.	.	.	.	.	.	.	.	2.33 (.92)	6.53*	10.28 [1.69, 62.38]	.17
Age (Adult)	.	.	.	.	.	.	.	.	.	.	.	.	-1.60 (1.00)	2.58	.20 [.03, 1.43]	.50
SNS Use													-.01 (.22)	.01	.99 [.64, 1.52]	.33
Network Size (Medium)	.	.	.	.	.	.	.	.	.	.	.	.	-.72 (.85)	.72	.49 [.09, 2.58]	.51
Network Size (Large)	.	.	.	.	.	.	.	.	.	.	.	.	.03 (1.09)	.01	1.03 [.12, 8.73]	.42
Self Esteem	.	.	.	.	.	.	.	.	.	.	.	.	-.32 (.15)	4.40*	.73 [.54, .97]	.91

	Model 2				Model 3				Model 4				Model 5			
	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P	$\beta$ (SE)	Wald	e [95%CI]	P
FOMO	.	.	.	.	.	.	.	.	.	.	.	.	.31 (.12)	6.90*	1.36 [1.08, 1.72]	.58
Self Disclosure	.	.	.	.	.	.	.	.	.	.	.	.	.26 (.13)	4.24*	1.30 [1.01, 1.67]	.56
Profile Data	.	.	.	.	.	.	.	.	.	.	.	.	.03 (.02)	2.36	1.03 [.99, 1.07]	.51
Between SNS user Variance	5.24 (1.57)	10.35**			5.11 (1.55)	10.96**			5.54 (1.73)	10.25**			3.84 (1.25)	9.37**		
Deviance (pD)	2904.76 (54.17)				2900.77 (54.67)				2866.86 (56.11)				2848.15 (58.16)			
DIC	2958.93				2955.44				2922.96				2906.31			
R <sup>2</sup>	.05				.05				.06				.07			

\* $p < .05$ ; \*\* $p < .01$ ; P = probability; all coefficients are unstandardised; SNS User N = 52, Male = 13, Female = 39; Online Connection N = 5113; Male = 2346, Female = 2734; No gender specified: 33; pD = parameters

#### 9.5.3.1 Modelling multilevel online connection characteristics

The next phase in modelling built on the null model with the inclusion of all online connection level variables (Models 2 and 3) and an interaction term between offline communication and Facebook communication (Model 4). Between SNS user variance remained significant for all models tested, Model 2  $\sigma^2_{u0} = 5.24$ ,  $SE = 1.57$ ,  $p < .001$ ; Model 3  $\sigma^2_{u0} = 5.11$ ,  $SE = 1.55$ ,  $p < .001$ ; and Model 4  $\sigma^2_{u0} = 5.54$ ,  $SE = 1.73$ ,  $p < .001$ . In all models, the *DIC* statistic was substantially lower than the null model, indicating that the inclusion of online connection-level variables provided a better model fit.

Over and above the role of the online connection variables on perceived disagreement, models 2, 3, and 4 also provided a means of testing the potential influence of offline communication on Facebook communication (RQ5: H5.7). First models testing for a potential mediating effect of offline communication was explored. Offline communication was excluded from model 2, only being entered in model 3 to test for a potential mediating influence in the relationship between Facebook communication and perceived disagreement. In both models Facebook communication remained a consistently non-significant predictor of perceived disagreement ( $p > .05$ ). Facebook communication was entered into a model with offline communication as the outcome variable, with all other level 1 variables controlled for. Facebook communication was not a significant predictor of offline communication,  $\beta = -.04$ ,  $SE = .17$ ,  $p > .05$ , indicating that there was no indirect effect. Furthermore, a Sobel test indicated that offline communication was not a significant mediator of the relationship between Facebook communication and perceived disagreement,  $p > .05$ .

Considering the non-significant mediation effect, the influence of offline communication was further tested in Model 4 for a potential moderating effect on

Facebook communication. The inclusion of the significant interaction term in model 4, along with the subsequent reduction in *DIC* points by 33.91, rendered the model preferable to both models 2 and 3 despite there only being a marginal increase in the  $R^2$  statistic. A full interpretation of the significant moderation effect is provided in Section 9.5.3.3.

#### *9.5.3.2 Modelling SNS user characteristics*

The final model (model 5) contained all the main study variables pertinent to both the online connections (level 1) and SNS users (level 2). Between-SNS user variance remained significant,  $\beta = 3.84$ ,  $SE = 1.25$ ,  $p < .001$ , but the coefficient was markedly lower. The *DIC* statistic for model 5 was 18.71 points lower than the *DIC* model and the  $R^2$  marginally higher. As *DIC* differences of above 5 points are preferable in terms of steering model selection (MRC, 2015), model 5 was deemed a better fit to the data and therefore was selected for further inspection and analysis.

#### *9.5.3.3 Final model outcomes*

At the SNS user level (level 2), significant differences were found in terms of SNS user age. Emerging adult SNS users (aged 19 – 21 years) were significantly more likely to report disagreement on their networks than both adolescent and adult SNS users,  $p < .001$ . Aside, from the larger proportion of emerging adults sampled, this finding could possibly be attributed to the life stage experiences of these young adult participants. For instance, as university students the higher rate of perceived disagreement might be a reflection of them starting relationships/friendships with others that they don't know and who come from different backgrounds. Therefore,

exposing them to social behaviours that might violate their norm expectations (Burgoon & Jones, 1976). There was no significant effect of gender at the SNS user level,  $p > .05$ .

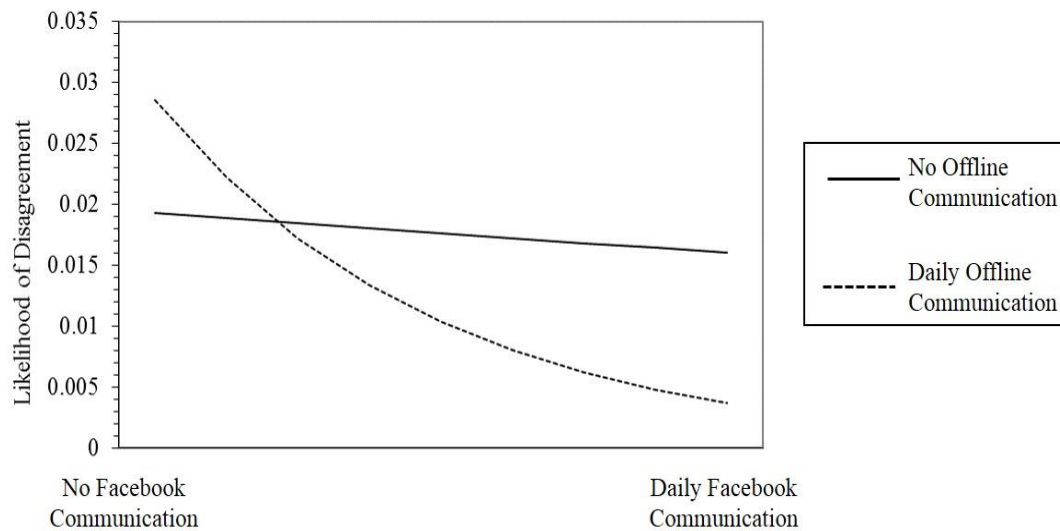
Psycho-social vulnerability was found to be a positive predictor of perceived online disagreement, with both self-esteem,  $\beta = -.32$ ,  $SE = .15$ ,  $p = .03$ , and FOMO,  $\beta = .31$ ,  $SE = .12$ ,  $p = .01$ , significant. SNS users with lower levels of self-esteem (.73) and higher levels of FOMO (1.36) were more likely to perceive and report troublesome online connections. In terms of connective behaviours, only self-disclosure was significant,  $\beta = .26$ ,  $SE = .13$ ,  $p = .03$ , indicating an association between SNS users who reported a higher preference for disclosing online with a 1.30 greater likelihood of reporting perceived disagreement with their online connections.

At the online connection level (Level 1), females were .79 times as likely to be disagreeable than male online connections. This can be interpreted as females being 21% less likely to be identified as a troublemaker than male online connections. While this would imply that males might be more problematic in an online setting, it could also be a product of the female-skewed sample used in this analysis. As such further investigation with a more representative sample is recommended. All known age-groups of Facebook 'friends' were significantly more likely to be identified as disagreeable as contacts whose age was unknown to the SNS user. This ranged from 3.32 times as likely for older adolescent online connections to 4.71 times as likely for adult online connections. No significant differences were found between the known age-groups in terms of their propensity for disagreement ( $p > .05$ ). Consistent with H5.8 the network popularity (centrality) of the online connections was identified as a significant predictor of perceived disagreement, with a 1% increase in online

connection network popularity signifying a 3% increase in the likelihood of the online connection being disagreeable.

In terms of perceived communication between the SNS user and online connections, offline communication was the only significant predictor across all models. While higher levels of communication (online and offline) provide opportunities for individuals to engage in both higher rates of positive, socially supportive interactions (Khan, Gagne, Yang, & Shapka, 2016), and negative interactions (Fox & Moreland, 2015), associations in the present study highlighted the potential role of communication from a disagreement context. In all models tested, higher levels of offline communication between the SNS user and online connections indicated that the online connection was more likely to be identified as disagreeable. Importantly, H5.7 postulated that offline communication would influence the relationship between online connections and disagreements. In support of this hypothesis, a significant negative interaction between offline communication and Facebook communication,  $\beta = -.24$ ,  $SE = .05$ ,  $p < .001$ , was found for the multi-level models, while Facebook communication was consistently non-significant,  $p > .05$ . The negative interaction coefficient indicated that when offline communication was more frequent the effect of Facebook communication on the likelihood of perceived disagreement was lessened. To explore the meaning of the interaction further, a logistic simple slope analysis was carried out. The likelihood of disagreement was plotted against the rate of perceived online communication for two different settings of offline communication rates (“Daily Facebook communication” or “No Facebook communication”), which resulted in the illustration provided in Figure 9.2. No Facebook and/or offline

communication indicates that the SNS users know and are connected to the online connection, but do not participate in any form of direct communication.



*Figure 9.2: Illustration of the interaction between rate of Facebook communication and rate of offline communication between SNS user and online connection when predicting likelihood of perceived online disagreement.*

For online connections who communicated infrequently with the SNS users' offline, the likelihood of them being perceived as disagreeable was unrelated to their rate of Facebook communication. In contrast, for high frequencies of offline communication, perceived disagreement was more likely in case of infrequent Facebook communication compared to frequent communication. As indicated in the analysis of communication means (see Section 9.5.2, p.305), disagreeable connections with higher levels of reported offline communication rates and infrequent Facebook communication appeared to be from routine offline connections such as classmates

and co-workers. However, in light of the sampling methods employed in the present thesis, it is advisable to test this assumption further with a larger and more representative sample.

## *9.6 Discussion*

The present analyses explored the influence of demographic factors, psycho-social vulnerability, perceived communication patterns, and structural network characteristics on sources of perceived disagreement within an online network. Considering both SNS user level and online connection level variables, including both self-reported and network metrics, the results offer a detailed and original multilevel perspective on the potential characteristics of troublesome networks. The main findings can be summarised in brief as follows. First, the FOMO hypothesis (RQ1: H1.1) was further supported. Psycho-social vulnerability, from the perspective of both FOMO and self-esteem was found to be a significant indicator of perceived online disagreement. Second, the network size hypothesis (RQ4: H4.1) was partially supported. While network size was not a significant multilevel indicator of perceived network disagreement, a significantly higher distribution of disagreeable online connections was evident in larger networks across the SNS user sample. Furthermore, in terms of other forms of connective behaviour, self-disclosure, was found to be a significant multilevel predictor of perceived disagreement. Third, consistent with the SNS user demographics hypothesis (RQ5: H5.1), younger SNS users were more likely to report troublesome online connections. Marked differences between known online connection age-groups were not evident, although knowing an online connection's age did statistically increase the likelihood of an online connection being identified as



troublesome. No significant effect of SNS user gender was evident. Furthermore, in line with previous literature, male online connections were more likely to be identified as troublesome. Fourth, a significant interaction between perceived Facebook communication and offline communication (RQ5: H5.7) suggested that online connections exhibiting low Facebook communication and frequent offline communication were statistically more likely to be troublesome on a network. Furthermore, a combination of offline communication patterns and frequency of relationship types provided some support for H5.6 (RQ5), with known offline contacts presenting a greater likelihood of disagreeable behaviour. Finally, the popularity hypothesis (RQ5: H5.8) was supported. Higher levels of digitally derived centrality exhibited by an online connection in the network was a significant multilevel predictor of perceived disagreement.

The influence of FOMO (RQ1: H1.1) in predicting reported instances of negative online experiences was supported by both correlational and multilevel analyses. When considered in the context of the statistically significant influence of low self-esteem, the results support the findings of previous analyses conducted in the thesis (see Chapters 4 (Section 4.5, p.179) and 5 (Section 5.4, p.202)). Offline psycho-social vulnerability on the part of the SNS user would appear to make the SNS user more likely to report perceived disagreement on the network. Whether this reported disagreement is real or the result of misinterpretation due to their vulnerability is beyond the scope of this analyses and should be a consideration for future research. The FOMO results do however, indicate that for the participants tested in the current research, FOMO appears to play a consistent and important influencing role in

predicting the characteristics of SNS users who report increased incidents or perceptions of negative online experiences.

The influence of SNS user network size (RQ4: H4.1) rendered mixed results. Larger networks exhibited a significantly higher proportion of troublesome online connections, with correlational data supporting the notion that higher levels of network size were associated with higher levels of perceived disagreement. As evidenced in Chapters 7 (Section 7.5, p.249) and 8 (Section 8.5, p.268) of the present thesis, and also stated in theories derived from previous literature on social spheres (Binder et al., 2012), larger networks harbour contacts from a wide range of heterogeneous social spheres rendering it more difficult for SNS users and online connections to moderate their communication and content to suit all audiences (Fox & Moreland, 2015). In this context, the visibility of interactions might facilitate a heightened awareness of tension-inducing social faux pas by online connections and SNS users alike (Binder et al., 2012) or equally might indicate higher levels of disagreement actually in occurrence on the network. Such a distinction should be the focus of further research which would aim to distinguish between perceived tension and actual experience.

The non-significant multilevel influence of SNS user network size on perceived disagreement was unexpected, but may indicate, as in Chapters 7 and 8, the secondary importance of network size once more information on network structure and composition is considered. From a statistical perspective, the categorical interpretation of SNS user-network size in combination with the modest level-2 SNS user sample size may have led to a reduction in effect size and stability (Snijders, 2005). The mixed results offered by SNS user network size indicate that further research is required.

In line with previous studies, SNS user's in non-adult age-groups tended to be more prone to report instances of perceived online disagreement (RQ5: H5.1). This would suggest that younger individuals might experience more negative experiences online. In line with the findings, experiencing online tension has previously been linked to transitional ages between adolescence and adulthood, an age when relationships, both online and offline, become more sophisticated and complex (Hinduja & Patchin, 2008).

The non-significant effect of SNS user gender was somewhat surprising due to findings presented previously in the thesis (e.g., chapter 4, Section 4.5, p.179), the theoretical support presented (e.g., Jones et al., 2013), and the modest female skewed SNS user sample. While prior research has been quick to demote any theories pointing towards females being a victimised gender, it has suggested that any increases in negative experiences reported might be in part due to younger females being relationally more active online and therefore more likely to experience such instances due to statistical frequency (Pujazon-Zazik & Park, 2010). While previous support for this notion has been indicated in previous chapters of the thesis, in the case of this analysis, it is likely that when SNS user gender was combined with other more highly associated variables (e.g., FOMO), any effect of gender was diminished.

In contrast, gender was a significant predictor of perceived disagreement at the online connection level. Male online connections were more likely to be identified as network troublemakers. Whilst there is marginal support for this finding in previous reports of online behaviour (Annenburg Public Policy Center, 2010), research into offline behaviours has postulated that troublesome males often partake in more direct forms of disagreement, with females adopting more indirect and potentially less visible

means (e.g., Björkqvist, 1994; Hess & Hagen, 2006; Owens, Shute, & Slee, 2000; Wyckoff & Kirkpatrick, 2016). Perceived tension and disagreement caused by male online connections might therefore be more noticeable to SNS user-users and therefore reported more frequently. This, however, raises questions over whether female online connections are less likely to cause trouble, or whether they merely adopt different behaviours in order for their indiscretions to go undetected. Considering the modest, female skewed sample used in this analysis, further research should further test the role of gender at the online connection level to determine whether male indiscretions are more visible to all users, not just females.

Increased popularity was also found to play a significant role in determining whether an individual online connection was reported as a perceived troublemaker (RQ5: H5.8). Complementing research which has suggested that troublemakers tend to be highly connected individuals with well-honed social skills (Arsenio & Lemerise, 2001; Volk et al., 2015), this indicates that online troublemakers have a greater degree of mutual connections in the SNS user's network. A possible explanation for this is that remaining 'friends' with such a popular troublemaker might be due to social necessity. Being seen to exclude a popular social figure, regardless of their online behaviour, could have a detrimental impact on an SNS user's social reputation (Bevan et al., 2012) in the offline world. From a structural point, the removal of a popular, central figure would alter network characteristics more substantially than the removal of a peripheral contact. Such changes in network structure are likely to have other negative psychological consequences, such as a weakened, less dense interaction pattern, and are therefore best avoided by users. While such speculation seems to offer

a valid explanation, the present quantitative theses is not able to substantiate this reasoning. Therefore, further in-depth qualitative research is recommended.

Next to structural and demographic characteristics, several findings emerged for the perceived communication patterns between SNS user and online connections. Rate of Facebook communication on its own was not a significant indicator of perceived network disagreement. SNS users ‘friend’ online connections for a variety of reasons, including active relationship maintenance, passive observation (nosiness), and social necessity. The degree to which an SNS user communicates online with an online connection will therefore not necessarily reflect the online connection’s online behaviour. The significant interaction between Facebook communication and offline communication supported this argument (RQ5: H5.7). Online connections who were known and in frequent offline contact (RQ5: H5.6) with SNS user were more likely to be identified as troublesome on a network when communication on Facebook was low. Complementing the role found for network popularity, this suggests that SNS users may have known and socially significant individuals residing on their online networks who they find digitally unappealing yet cannot afford to disconnect from. It may be that in some instances these are genuine friends of the SNS user that do not possess the necessary digital interaction skills but merit an online presence due to emotional attachment to SNS user. It is more plausible, however, that the rate of offline interaction is not brought about by friendship, but dependent on routine daily interaction (as in the case of work colleagues or study group members) or interaction caused by third parties (as in the case of a friend’s friend or a relative’s partner). The differences observed in this chapter alluding to online and offline communication patterns between relationally close disagreeable associations (e.g., family and friends)

and routine, but significant disagreeable connections (e.g., classmates and colleagues) provides some support for this reasoning.

Next to popularity and interaction patterns, further support for the overall relevance of troublesome online connections came from the fact that a large and significant proportion of problematic online connections were categorised as possessing meaningful relational links to the SNS user. Furthermore, the significant chi-squared differences between disagreeable individual social spheres within the current, past, and loose connection groups provided some marginal support. Conducive with expectations derived from norm violations theory (McLaughlin & Vitak, 2012), it is quite possible that the perceived indiscretions by such individuals might be more noticeable due to their flagrant disregard for known and established offline social boundaries. However, this notion was not further supported by the inclusion of relationship type in the multilevel models. The mixed results suggest that further detailed research is required. While the present thesis has been able to suggest the social spheres that might be more problematic for the current sample, the frequency count for some of the spheres tested suggest that a larger, more representative sample is required. This will allow researchers to better determine the extent to which these online connections from specific social spheres might be more problematic than others.

A few caveats should be raised regarding the findings. First of all, as with many nested data structures, the degrees of freedom were substantially different for SNS user and online connection levels, and significant correlations were obtained at the online connection level, even where these coefficients were small in size. As such, in line with the approaches adopted in the previous empirical chapters, caution against an

over-interpretation of correlations is in order, and more should be assigned to the regression outcomes since the logistic multi-level modelling allowed for more stringent hypothesis testing.

In terms of SNS user sample size, while the networks allowed for a comparison across age-groups, a modest 52 networks cannot represent the enormously large and diverse user population as such. Further, low rates of perceived disagreement reported by the sample, while complementing prior research into reported incidents of online trouble-making (Lenhart et al., 2011), do not necessarily reflect the behavioural intricacies of the networks in question. Therefore, further research using a larger, more representative SNS user sample is recommended.

The use of digitally derived characteristics has facilitated an interesting and original overview of the size, diversity, and relational structures present on the networks, however, the behavioural outcomes have relied on participant self-report. As such, what constitutes disagreeable or disturbing behaviour for one user will not necessarily be consistent across the SNS user sample. With this in mind, further large scale, in-depth analysis is recommended with a representative SNS user sample. This would provide a sufficient number of troublesome contacts to analyse particular disagreeable behaviours separately and to shed further light on how specific user characteristics, such as gender differences, both on the side of SNS user and online connection, might impact the interpretation of incidents and sanctions used (e.g., unfriending) on online networks. Further, content analyses, automated or non-automated, of disagreeable profile elements and online exchanges can serve to improve the overall accuracy and predictive power of any procedure used to identify

troublemakers, as the self-reported measure of perceived disagreement cannot alone provide this level of interpretation.

To conclude, the present analyses provide significant and original multilevel support for the association between psycho-social vulnerabilities, sociodemographic factors, communication patterns, and structural network characteristics on one side, and troublesome contacts in online networks on the other. These findings increase our understanding of the types of individuals who are more likely to become involved with or perpetrate, or indeed report, trouble on a network. Furthermore, the findings provide additional support and explanation for the analyses presented earlier in this thesis. Perceived social disagreements online tend to result in a less enjoyable experience and, in more extreme cases, leads to detrimental psychological consequences for both SNS users and online connections alike. The findings therefore have the potential to carry implications for online interventions, either as part of SNS design and development or in the form of information campaigns targeting specific users. Further implications of this work will be discussed in Chapter 10.



## **Chapter 10: General Discussion**

### *10.1 Chapter introduction*

The doctoral research presented in this thesis investigates the associations between offline psycho-social vulnerabilities, the use of online ego-centric SNS, and negative online experiences. A consistent argument presented throughout the thesis is that a SNS user's offline psycho-social characteristics have the potential to influence both the way in which individuals use and interact with their online networks, and their potential to experience and/or perceive vulnerability to negative online experiences. Chapter 10 provides a general reflective discussion outlining the main findings of the research, reflections on the overall methodology, opportunities for future investigation, and the potential implications that arise from this programme of research. The chapter also highlights the unique contribution that the research has made to our knowledge and understanding of the implications of psycho-socially motivated ego-centric SNS use.

### *10.2 Research findings*

Research into online vulnerability has previously speculated that certain individuals who engage with SNS might be more prone to perceiving and/or experiencing negative online experiences (Staksrud et al., 2013; Wilcox & Stephen, 2013). Several factors that might make an SNS user more prone to such vulnerability have been proposed, including an SNS user's offline psycho-social characteristics, time spent online, the social connections present on an individual's network, and an individual's self-disclosure of personal information (Dredge et al., 2014; Huang et al., 2014; Lenhart et al., 2011; Madden et al., 2013; Manago et al., 2012; Staksrud et al., 2013). The

research presented in this thesis provides an in-depth investigation into the way in which these factors interact and influence online behaviours and the perception and/or actual experience of negative online experiences on ego-centric SNS. Specifically, the research has focussed on the following core aim:

To consider how offline psychological characteristics (including self-esteem and FOMO), online behaviours (including self-disclosure), and the characteristics of online networks (including the number and type of connections) are related to the experience and perception of negative online experiences (including risk, e.g., disagreement, connecting to strangers, and harm, e.g., hurtful comments).

In doing so, the thesis has considered five research questions (RQ):

RQ1. Does FOMO influence an ego-centric SNS user's reported exposure to negative online experiences?

RQ2. Does FOMO influence the rate of connective behaviours (perceived and actual)?

RQ3. Do psychologically vulnerable users demonstrate an increased capacity to enter a potentially detrimental spiral of online behaviour over time?

RQ4. Does the accumulation of large, diverse online networks influence the reported rate of negative experiences online?

RQ5. Are certain user and/or network characteristics more likely to influence an SNS user's perception of and/or reported exposure to negative online experiences?

Table 10.1 provides a summary overview of the core research findings made by the thesis in response to these research questions. In doing so, the table highlights the original contributions to knowledge made by this substantive body of research.

*Table 10.1: An overview of the core research findings and original contributions*

Research Finding	Chapter(s)	RQ
Offline psycho-social vulnerabilities (i.e., lower levels of self-esteem and higher levels of FOMO) were found to be associated with higher self-reported levels of exposure to negative online experiences.	4	RQ1
Higher levels of FOMO were found to be associated with higher levels of self-reported SNS use and connective behaviours (i.e., online friending and self-disclosure).	4	RQ2
Temporal associations indicated the start of a cyclic relationship between offline psychological vulnerabilities, SNS use, and self-reported exposure to negative online experiences. This suggests that psychologically vulnerable users may be more likely to enter into a detrimental spiral of online behaviour over time.	5	RQ3
The accumulation of large, diverse (socially and structurally) networks was found to be associated with higher reported levels of negative online experiences. This	7	RQ4

was supported by a combination of self-report and digitally derived data unique to the present thesis.

Larger, diverse networks were found to play host to contacts displaying a range of anomalous characteristics (e.g., pseudonyms, misclassified profiles, and network outliers).	8	RQ5
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Higher numbers of misclassified profiles mediated the association between network diversity and higher reported levels of negative online experiences.	8	RQ5
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Higher levels of perceived negative online experiences (i.e., disagreement) were found to be associated with sociodemographic factors (e.g., age and gender), psychosocial vulnerabilities (i.e., self-esteem and FOMO) communication patterns, and structural network characteristics (e.g., network popularity).	9	RQ1, RQ2, RQ5
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Perception of self-vulnerability towards negative online experiences was found to be associated with user age, gender, and levels of FOMO.	6	RQ5
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Perceptions of vulnerability towards negative online experiences in other users (i.e., an unrelated adolescent SNS user) was found to be associated with user age, gender, level of FOMO, and network size.	6	RQ5
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The first empirical chapter (Chapter 4) attended to RQ1. The chapter reported the SEM based findings from a cross-sectional online survey study of 506 UK based Facebook users (13 to 77 years). In this chapter, potential associations between offline psycho-social vulnerabilities, SNS use, online connective behaviours, and negative online experiences were considered. Of particular interest in this chapter was the addition of FOMO, as an offline psycho-social characteristic in the analysis.

As discussed in Chapter 1 (see Section 1.2.3.1.2, p.29), relatively recently research has begun to explore FOMO which is an under-researched concept in the psychological literature. Exploring the role of FOMO was central to the present thesis, as it provides a means of understanding the psycho-social characteristics and concerns that can be borne from interacting with social connections, over and above that of psychological vulnerability (i.e., self-esteem) alone. In an increasingly digital landscape, where opportunities for social comparisons have increased and social connections are not constrained by geography, it is important to consider how an individual's offline psychological wellbeing can be influenced by the social connections that an individual observes and interacts with on a routine (and often simultaneous) basis. Consideration of FOMO provides this opportunity.

FOMO is a form of social anxiety that has been shown to be particularly pertinent to SNS users, with FOMO being linked to higher levels of SNS use in individuals exhibiting low levels of self-esteem (Przybylski et al., 2013). Perceptions of FOMO are exacerbated when individuals make social comparisons with others in both offline and online domains. For individuals prone to FOMO, online platforms provide an ideal conduit to attempt to regulate perceived deficits in psycho-social needs (Williams, 2009). Connective behaviours such as online friending and self-disclosure provide

opportunities to gain a sense of belonging, competence, and independence. However, in the hands of the psycho-socially vulnerable they also provide the potential for individuals to experience a less than gratifying experience. While an association between FOMO and SNS use, in psychologically vulnerable individuals, has been previously explored (Przybylski et al., 2013), associations with connective online behaviours (i.e., online friending and self-disclosure) and negative online experiences had not empirically been tested. The current thesis has provided this original contribution to the literature.

The findings presented in Chapter 4 (Section 4.5, p.179) provide evidence of the influence of FOMO. In response to RQ1, the findings demonstrated an association between an individual's level of FOMO and self-reported levels of exposure to negative online experiences. In that, higher levels of FOMO were associated with higher levels of negative online experiences. FOMO was also found to mediate the relationship between offline levels of self-esteem and exposure to negative online experiences, being more apparent for users who were younger and female. In response to RQ2, the results of Chapter 4 indicated positive associations between FOMO and online connective behaviours. In that, individuals exhibiting higher levels of FOMO reported having larger networks of online connections and higher levels of self-disclosure. Expanding the findings of Przybylski et al. (2013), together the findings of the present thesis show that FOMO appears to influence more than merely the use of SNS in psychologically vulnerable individuals. Higher levels of FOMO have the potential to also further exacerbate a psychologically vulnerable user's engagement with connective behaviours and likelihood of reporting negative online behaviours. This is an important and original contribution to the literature as it highlights the

potential role that social anxieties stemming from making social comparisons between the self and others can have on an individual's online experience.

Building on the findings of Chapter 4, a two-phase longitudinal SEM-based analysis of a sub-sample of the Facebook users ( $N = 175$ ), was presented in Chapter 5 (p.202). The chapter investigated the temporal associations demonstrated between offline psychological vulnerability (i.e., self-esteem), FOMO, connective behaviours, and reported exposure to negative online experiences (RQ3). The findings presented provided significant self-reported support for longitudinal relationships between offline psychological vulnerability, FOMO, SNS use, and negative online experiences, adding to the cross-sectional findings previously demonstrated in the thesis. Lower levels of self-esteem at T1 were associated with higher levels of FOMO, SNS use, and reported exposure to negative online experiences at T2. Furthermore, higher levels of use at T1 (which had previously been associated with individuals higher in FOMO in Chapter 4) were associated with higher levels of FOMO at T2. Such findings provide a unique and original perspective on the notion that psycho-social vulnerability has the capacity to plunge users into a 'self-regulatory limbo' (Przybylski et al., 2013), which until now had not been tested. In doing so, the present thesis provides an original contribution to the literature in that it highlights, through longitudinal analysis, that offline vulnerability appears to set off this cycle more than online behaviours and experiences can do alone. As such, in contrast to previous techno-deterministic research (e.g., Dwyer, Hiltz, & Passerini, 2007; Kraut et al., 1998), the thesis argues that an individual's offline characteristics are an essential factor when considering online behaviours and outcomes.

The evidence presented in Chapters 4 (Section 4.5, p.179) and 5 (Section 5.4, p.202) of the thesis indicated that individuals displaying offline psychological vulnerability might be more prone to reporting exposure to negative online experiences. This would suggest that users might benefit from online safety information and interventions that present a more psychologically informative perspective on the relationship between an individual's mental wellbeing, their online behaviours, and their potential for negative online experiences. The impact and effectiveness of any recommendations and interventions suggested, however, are dependent on whether a SNS user perceives themselves to be at risk of vulnerability. Previous research has suggested that perceptions of risk might be linked to a user's age, in that certain age-groups of users might be more prone to attributing risk to other people rather than themselves (Chapin, 2014; Debatin et al., 2009; Paradise & Sullivan, 2012; Tsay-Vogel, 2015).

Chapter 6 (Section 6.5, p.225), tested the extent to which individual SNS users perceived themselves and others to be vulnerable to negative online experiences. In doing so, this provided evidence for RQ5. Using both cross-sectional (N = 489) and longitudinal (N = 90) analyses, the findings demonstrated that a third-person effect was evident for older SNS users, with both emerging adults and adults being significantly more prone to attribute the potential hazards of online life to an adolescent SNS user (measured via a vignette) than themselves. Older SNS users also rated their perceived self-vulnerability significantly lower than their adolescent counterparts. Furthermore, perceived self-vulnerability and third-person vulnerability was higher in individuals who exhibited higher levels of FOMO. Overall, the findings from Chapter 6 support the notion that age can impact an individual's perception of risk. It also highlights the role that psycho-social vulnerability can play in such



perceptions. In doing, so it highlights that any recommendations and interventions borne from the present research should be tailored to the specific needs and characteristics of the different individuals that use SNS platforms. These characteristics were explored in more detail in the remaining empirical chapters (Chapters 7, 8, and 9).

While the empirical results reported in Chapters 4 and 5 demonstrated original evidence in support of psycho-socially influenced online behaviours (RQ2) and outcomes (RQ1), the findings, in common with previous SNS-based studies (e.g., Binder et al., 2012; Manago et al., 2012), were reliant on self-reported measures. In the field of psychology, the use of self-reported data has a long and established track record. However, as psychological studies increasingly move into the realms of cyber-communities, an over reliance on self-reported analyses risks researchers not accurately observing the true intricacies of online life. Furthermore, as previously described in Chapter 7 (Section 7.3, p.243) individuals sometimes tend to misreport key online properties such as network size, as their online networks can number in their hundreds or even thousands, rendering them difficult to recall with any great accuracy (Marwick & boyd, 2011). Potential consequences of self-reported estimates can lead to the analysis of unreliable data, thus making it difficult to draw assumptions based on self-reported estimated metrics alone. For this reason, the present thesis sought to employ digitally derived metrics (see Chapter 3, Section 3.6.2, p.147, for an overview of the digital methods used in Chapters 7, 8, and 9) to resolve such inconsistencies and further clarify our understanding of online vulnerability. In so doing, the present thesis outlined a detailed and original examination of a specific online connective behaviour, online friending, using a combined dataset of digitally

derived network characteristics (i.e., network size) and self-reported measures (i.e., negative online experiences), which at the time of writing had not previously been evidenced in the body of SNS vulnerability literature. The empirical findings presented in these chapters provided evidence for the potential implications that might be borne from developing and maintaining an online network of social connections.

Chapter 7 addressed the potential relationship between a specific FOMO inspired form of connective online behaviour, online friending, and negative online experiences, in response to RQ4. Using a combination of self-reported (social diversity and negative online experiences) and digitally derived (network size and structural diversity) metrics from a digital sub-sample of the UK based Facebook users ( $N = 177$ ), the inclusion of digitally derived metrics supported the notion that larger online networks are associated with higher reported levels of exposure to negative online experiences (Chapter 4, Section 4.5, p.179). It also allowed for the analysis to be extended to consider the role of diversity on the network by comparing self-reported estimates of social diversity (i.e., the number of types of social capital an individual has in their network) to digitally derived data pertaining to the networks structural diversity (i.e., network clusters). The research concluded that larger, more diverse networks might be more susceptible to negative online experiences. In so doing, the findings provide an original contribution to knowledge, in that they extend the results presented previously in this thesis, and in previously published studies looking at the role of self-reported online diversity and social tensions/vulnerability (Binder et al., 2012; Vitak, 2012).

A major advantage of using digitally derived network data was that it facilitated an exploration of not only the associations between structural network characteristics

(e.g., network size and diversity) but also the individual characteristics of the social connections within the networks. In so doing, the combined dataset presented a unique way of addressing RQ5. Previous attempts to characterise individuals involved in vulnerable networks have very much relied on self-reported incidents and admissions by victims and perpetrators (Kokkinos et al., 2016; Pabian et al., 2015; Ybarra & Mitchell, 2004). As such they have been somewhat constrained by a SNS user's ability to recall not only the incidents of vulnerability but also the individuals on the network. The use of the combination of digitally derived data and survey/self-report data to consider the characteristics of both SNS users and the potentially troublesome individuals that might reside on the networks (RQ5), is an original contribution of this thesis. Not only did the combined dataset provide a much greater degree of accuracy for measures such as network size, by reducing the potential for user bias, it also provided an answer to the research question that data from these sources could not provide in isolation.

The role of specific individuals on the user networks was first addressed in Chapter 8 (p.262). Building on the associations found between network size, diversity, and negative online experiences in Chapter 7 (p.240), the analyses presented sought to determine whether the presence of non-standard users in a network might present a greater propensity for negative online experiences. In common with the measure of social diversity presented in these chapters, previous theoretical explanations had tended to focus on 'standard' user characteristics and types (Binder et al., 2012; McCarty et al., 2001), generally identifying potential links between standard social capital groupings on the network (e.g., whether they were a friend, family member, or acquaintance). SNS user networks, however, often contain a much more complex

array of connections with some accounts being much harder to classify, such as those depicted by pseudonyms, missing identifying data (e.g., gender), misclassified profiles (e.g., personal profiles used for commercial purposes), and network outliers (i.e., accounts only connected to the ego). In the present thesis, such accounts were deemed to be anomalous (i.e., non-standard). Drawing on literature outlining the presence, prevalence, and potential risks of anomalous accounts (Facebook, 2015; Hogan, 2012), self-report and digitally derived data was used to identify and analyse the potential association between accounts displaying such non-norm characteristics and a user's online vulnerability (N = 177).

Findings from Chapter 8 (Section 8.5, p.268) demonstrate that the presence of misclassified profiles on a user's network was predictive of higher levels of reported exposure to negative online experiences, with higher numbers of misclassified profiles being found to mediate the association between the number of structural clusters on the network and higher levels of exposure to online vulnerability. The potential impact of other forms of anomalous characteristics were found to be much more mixed with initial correlational support for their role in online vulnerability diminishing in power when considered in the realms of the full mediation model.

The analysis presented in Chapter 8 (Section 8.5.3, p.274) lends support for the potential detrimental impact of users connecting to certain types of 'social' profiles (i.e., misclassified profiles) that deviate from the expected norms of the digital platforms. However, it also calls into question the role of certain 'non-norm' connections, such as those using a pseudonym, which the online platforms have traditionally associated with the potential for negative online experiences (Hogan, 2012). In psychological research, the concept of non-standard network connections

had to this point been presented as a largely theoretical and untested implication of online life (Hogan, 2012). Self-report alone does not adequately provide a means of gathering in-depth details of SNS user's social networks. The identification and testing of non-standard online connections demonstrated in this thesis is only made possible by the use of digitally derived data. Therefore, the analysis presented in Chapter 8 is an original contribution of this thesis, and one only rendered possible by the use of the combined dataset. The findings, although a clear contribution to the literature, highlight that a greater understanding of non-norm online contacts is now required in order to better facilitate the identification of users and networks that might be at risk of vulnerability to negative online experiences. The present thesis, in its consideration of four potential non-norm characteristics has provided a good starting point in terms of re-defining what might constitute a potentially problematic anomalous profile. Researchers should now look to further utilise combined datasets to further refine the characteristics of such non-norm profiles.

With a potential link between anomalous profiles and reported exposure to negative online experiences evident, the user characteristics of potentially vulnerable online networks was approached from the context of 'standard' users in Chapter 9 (p.284). Drawing on previous self-report research alluding to links between online vulnerability and sociodemographic factors (e.g., age and gender) and communication habits (Annenberg Public Policy Centre, 2010; Aricak et al., 2008; Sengupta & Chaudhuri, 2011), the present thesis extended our understanding of the role of specific user characteristics in predicting the likelihood of user's maintaining a potentially problematic and vulnerable network, by integrating digitally derived representations of user networks with self-reported accounts of troublesome individuals on those

networks. The interaction between individual SNS user characteristics and their perceptions of relationships, with the objective digitally derived characteristics of the networks allowed for the thesis to test and make predictions of who is more likely to perceive negative experiences online. In so doing, the analysis presents an original contribution to the previous self-report based body of literature.

Using a large digitally derived random sample of 5113 network connections derived from 52 UK based profile holders, the complex multilevel analysis presented in Chapter 9 (p.307) combined self-reported data of the users' characteristics and perceived ratings of online communication habits (e.g., rate of online and offline communication) with digitally derived metrics pertaining to the profile holders' network size and the structural popularity of their connections (e.g., how many mutual profiles each connection was connected to within the ego network). Findings from the study demonstrated associations between connecting to troublesome individuals and an SNS users offline psycho-social vulnerabilities, sociodemographic factors, online connective behaviours, perceived communication patterns with their online connections, and structural network characteristics. In so doing, the findings increase our understanding of not only the characteristics of the individuals that might be more likely to perceive negative online experiences, but also the characteristics of the connections that might contribute to these perceptions. SNS users who were younger, exhibited higher levels of psycho-social vulnerability (i.e., self-esteem and FOMO) and higher self-disclosure rates were more likely to perceive negative online experiences. In terms of the connections they perceived to be problematic, connections who were socially popular (i.e., highly connected online), known in the offline world, but being perceived to engage with the SNS user infrequently online were more likely

to be implicated. The identification of such characteristics (SNS user and connections) offer opportunities for platforms, policy makers, and educationalists to target online safety interventions to greater effect.

The empirical evidence presented in the thesis has demonstrated that offline psychosocial vulnerabilities, SNS use, and connective behaviours, are associated with reported exposure to negative online experiences. Furthermore, it has also demonstrated a range of characteristics, pertinent to the individuals, their connections and the networks in which they reside, that might contribute to both the exposure and perceptions of negative experiences. Combining this empirical evidence with the findings from Chapter 6 (p.225) on SNS user perceptions of online vulnerability, it would suggest that SNS users might benefit from safeguarding recommendations that increase awareness of the potential interaction between an individual's offline characteristics and their potential online behaviours and outcomes. Potential implications of the research are discussed further in Section 10.5 (p.351).

### *10.3 Methodological reflections*

Psychological studies of online SNS use have largely relied upon self-reported methods of data collection (e.g., Debatin et al., 2009; Fogel & Nehmad, 2009; Staksrud et al., 2013). Such methods, while providing interesting insights into online life, struggle in isolation to provide an adequate means of reflecting on the intricacies of an individual's digital existence. A unique contribution of the current thesis was in its use of a multi-methods approach to data collection and analysis. From a general methodological perspective, the combination of self-report (i.e., online survey and network appraisal) and digitally derived data (i.e., network size and diversity

measures) presented in this thesis helped to provide a detailed and unique investigation into the psychological characteristics of SNS users, their online behaviours and network characteristics, and the potential vulnerabilities that might ensue.

The use of cross-sectional and longitudinal datasets allowed the thesis to corroborate previous theoretical understanding of SNS use, providing a means of empirically testing the potential implications of psycho-socially motivated online engagement. Moreover, the longitudinal analysis presented a unique contribution to the literature in being able to show that offline psycho-social vulnerability has the potential to set off a cycle of negative online experiences, more so than actual use, connective online behaviours or the negative experiences themselves do. Furthermore, the use of a range of complex statistical analysis methods (e.g., Mediation, SEM, Multi-level modelling, SNA) served to ensure that the self-report and digitally derived data collected during the research were tested via the most appropriate method for the datasets. The combination of these statistical methods is unique to this thesis and has allowed for a greater degree of data interpretation than has previously been evidenced in the realms of SNS research.

The most challenging aspect of the research methodology was the implementation of the online data collection methods. Online surveys were used throughout this research to collect self-reported demographic and psychometric data. The advantage of using online surveys are numerous (Evans & Mathur, 2005). In the scope of this research they facilitated access to a much larger and diverse number of participants than would have been possible by other means, by enabling participants to access surveys remotely, engage with an intuitive format, and use a digital device of their choosing (e.g., laptop, smartphone, tablet). Online surveys also provided an effective means of



ensuring safe and secure data collection, and the ability to easily track participants from a longitudinal perspective.

However, the use of online surveys is not without its problems. In some circumstances online surveys can be hampered by recruitment issues, lack of user understanding, and technological availability (Evans & Mathur, 2005). In the context of the present research, the recruitment of participants, while rendering an overall initial sample of 506 participants, was not conducive with attaining a larger, representative sample. Recruitment targeted three groups of Facebook users (school-aged adolescents, university students, and online adult users). In doing so, recruitment of potential participants relied on the individuals and/or organisations (i.e., schools) responding to invitation letters and advertisements (see Chapter 3, p.108, and Appendices 1 & 2). It is not possible to discuss specific response rates for the adult and university surveys, as it is unclear how many people saw and/or interacted with the initial invitations. However, the use of potentially over-sampled populations (i.e., psychology students at the university) is likely to have somewhat hindered uptake. In terms of the school responses, only a modest number of schools accepted the invitation to participate (initially five schools). Recruitment of school-aged participants was therefore limited to students from these schools, and the selection of classes/students determined by the head-teachers.

Following on from the initial recruitment of the sample, the sample size for the longitudinal survey declined over time. To monitor the impact that such participant losses had on the overall findings of the research, attrition analyses were completed for the online survey (see Chapter 3, Section 3.6.1.3, p.135). Small but significant differences in the levels of negative online experiences and self-esteem reported across

the samples from T1 to T3 were found. No other differences were evident in the main study variables. While, longitudinal attrition is an expected outcome of such research (Henn, Weinstein, & Foard, 2009), in this case it was hindered somewhat by issues relating to follow-up recruitment, user understanding, and technological availability.

Follow-up recruitment relied on invitation emails being sent to schools, university students, and online adults who had indicated a willingness for continued participation in the research. This method of self-selection limited the reach of the potential longitudinal sample. Furthermore, as with the initial round of recruitment, the sample size relied on individuals seeing and interacting with the invitations. In the case of the schools, recruitment was also dependent on students being willing to continue their participation on the day of data collection.

Issues of understanding of the longitudinal instructions was most pertinent amongst the school-based adolescent sample. Some participants appeared to lack clear understanding of the survey instructions, leading to incorrect and/or inconsistent user naming conventions. While this did not render itself problematic in the cross-sectional studies, longitudinally it resulted in several participant responses being excluded on the grounds of ‘unmatched’ responses.

From a technological perspective, the successful completion of the online surveys was very much bound by the participants’ ability to access a suitable digital device. In the case of the adolescent sample, the accessibility of computers in some schools posed significant problems, leading ultimately to three of the five schools dropping out over the course of the research. Researchers wishing to conduct survey-based research in schools should be mindful that access to technology in schools is not consistent across institutions. To meet the demands of a survey study, measures should be put in place

(i.e., paper-based alternatives) to ensure participation can be achieved. In the present research, such alternative measures were used to great effect during the data collection phase for the network appraisal study presented in Chapter 9 (see Chapter 3, Section 3.6.3, p.157, and Appendix 5, for an overview of the methods and materials used), with both school-based adolescents and university undergraduates engaging with paper-based data collection resources in a bid to overcome potential ICT availability and task understanding issues.

In addition to the apparent lack of available ICT resources, some of the schools reported difficulties in using the embedded links within the online surveys to gain the digitally derived Facebook data. Many local authorities and individual schools have restricted access to such sites and applications, rendering research directly involving SNS platforms problematic. In terms of the present research, two of the schools involved in the adolescent data collection were unable to offer data pertinent to the digitally derived studies. It should be noted that in both instances permission to invite students to access the data had been granted by both the Head-teacher and parents of the students, however, network settings could not be overturned. Researchers wishing to invite school-based participants to access such platforms (where permission has been previously granted) should consider providing digital devices with alternate connectivity (e.g., via mobile internet) in a bid to overcome such connectivity issues.

Aside from technological access issues, data privacy is central to digitally derived methodologies, both in terms of the use of online surveys and the collection of SNS metrics. The collection and analysis of such data is bound by strict data privacy policies and ethical requirements (BPS, 2012; Facebook, 2016) to ensure the privacy of not only the participants but also the privacy of their online connections. Data

collection and analysis methods were carefully selected and monitored throughout the present research to ensure all work completed adhered to data privacy requirements (see Chapter 3, p.147, and Appendix 6). Furthermore, it should be noted that all digital SNS data collected during this research was obtained prior to a major overhaul in data privacy policies by Facebook in April 2015.

### *10.3.1 Methodological implications*

The methodological implications of the research presented in this thesis are numerous. An original contribution of the current thesis is that it highlights the way in which digitally derived data can be used to support and strengthen self-reported findings (surveys and researcher-led network appraisals). In doing so it suggests that researchers should be encouraged to embrace the digital age, not merely as a topic area, but also as a means of gaining a wealth of highly detailed and academically interesting data.

The widespread use of SNS data in online research carries several implications. From a user perspective, online privacy must remain of paramount importance. Researchers should not have or indeed expect to have unbridled access to a digital user's content and/or structural information. While digital literacy in terms of SNS usage is generally adequate (Crook, 2012; Ng, 2012), a user's understanding of the accessible data that can be borne from their online endeavours and how it can be used to benefit research is likely to be less well informed. Without such understanding users are unlikely to feel comfortable having their digital existences scrutinised, thus presenting a potential block to successful academic investigation. Research using SNS data should therefore

be mindful that a SNS users understanding of the platform and related data privacy expectations need to be managed with utmost consideration and respect.

This notion of data privacy is potentially one of the biggest challenges when using digitally derived data. Protecting the identity of the participants and their online connections can be fraught with complexity. SNS data provides a myriad of personally identifiable data points, including the names and account numbers of online users. In general, the anonymization of SNS data can be approached using standard confidentiality methods commonly employed by psychological research (e.g. removal of names and personal identifiers). However, researchers should be aware that the structural information contained in SNS data could potentially deliver a means of providing identifiable clues to a SNS user's identity should individuals possess the technological know-how to be able to compare the patterns of connectivity present in the networks held within a dataset to those held at a more global level. As such, researchers must be mindful of recent recommendations regarding the use and storage of such data for research purposes (Binder, Buglass, Betts, & Underwood, 2017).

#### *10.4 Limitations and future research*

Several limitations and avenues for future research have emerged from the present thesis. The longitudinal research findings pertinent to offline psychological characteristics (e.g., self-esteem) being motivational drivers of online behaviours and vulnerability to negative online experiences (Chapter 5, p.207) provide good grounds for further research. It would appear that offline psychological vulnerabilities have the potential to plunge a SNS user into a cycle of detrimental SNS usage and connective behaviours, supporting the notion of a psychological 'limbo' (Przybylski et al., 2013).

While the current research provides good evidence for the start of such a cycle, the two-wave analysis of longitudinal data is not sufficient to fully observe the phenomenon over time. The research presented in this thesis should therefore be viewed as a starting point to encourage researchers to engage in additional longitudinal investigation over at least three-waves of data collection.

Another avenue for further research stems from the current thesis' use of global measures of perceived and actual negative online experiences. While such measures provide a useful indication of a SNS user's general perceptions and exposure, they do not adequately allow for an in-depth analysis of the impact that offline psycho-social characteristics, SNS use, and connective behaviours might have on specific forms of negative experience (i.e., specifics risk and harms). The models presented throughout the thesis offer the potential for the generic negative online experience measures to be replaced by specific and detailed measures pertinent to different potential online risks (e.g., disagreement, connecting to strangers) and harms (e.g., hurtful comments). Furthermore, more could be made of the users' actual lived experiences, in terms of gaining detailed insights into the ways in which individuals engage with SNS, their psycho-social motivations, the negative experiences they encounter, and the extent to which they might suffer psychological harm. For this, a qualitative perspective is recommended, as interviews have the potential to provide additional meaning to the psychometric and SNS data presented (Henn et al., 2009).

The time constraints of the current research and the complexity of the data collection presented did not lend itself to an in-depth investigation of more than one of the online connective behaviours discussed in this thesis (online friending and self-disclosure). Chapters 4 (Section 4.5, p.179) and 5 (Section 5.4, p.202) supported self-reported

associations between the main study variables and both self-disclosure and online friending habits. Online friending and the characteristics of such individuals were then explored in detail using multi-methods in Chapters 7 (p. 249), 8 (p.268), and 9 (p.295). Future research should consider utilising digital means to delve further into the self-disclosing habits of online users. In considering the rate and propensity towards disclosure alone, the research does not address specifically the exact nature of the content that individuals are disclosing. A multi-methods approach to online self-disclosure is needed to provide support for the self-reported findings of this thesis and enhance our understanding of what and why individuals self-disclose online.

The present thesis, while grounded in the use of Facebook, demonstrates findings that are likely to be applicable to users of other reciprocal ego-centric online networks (e.g., LinkedIn) which share a common network topological structure. With online users increasingly choosing to engage in a variety of different SNS, it is important that the factors that might influence users' vulnerability to negative online experiences are not seen to be dependent on any one particular platform. As discussed in Chapter 1 (see Section 1.2.1, p.20), ego-centric networks are semi-public networks that are largely based on mutually agreeable interactions between users. This reciprocal process of online interaction draws on offline approaches to relationship formation and maintenance, thus promoting a sense of trust in the individuals on the user's networks, whether they be personal (i.e., Facebook) or of a more professional nature (i.e., LinkedIn). With these basic similarities in mind, the findings of the current thesis, with respect to the influence of offline psycho-social characteristics, connective behaviours and the characteristics of potentially problematic individuals and networks, are likely to be pertinent to a number of different ego-centric platforms.

However, it should be noted that the findings of the present thesis are not necessarily generalisable to all users of all ego-centric networks. With users of ego-network platforms numbering in their millions (and billions in the case of Facebook), it would be foolhardy to suggest that the findings of this research could provide a wholly accurate account of the motives, behaviours, and vulnerabilities of all users. Future research should look to strengthen the original findings presented in this research by moving away from Facebook being the *de rigueur* platform for the investigation of online social life. Consideration of a range of ego-centric network platforms, with representative samples is required. Furthermore, research could extend to consider the extent to which the findings of this thesis might be applicable to alternatively structured online social platforms (e.g., follower-follower networks such as Twitter).

### *10.5 Empirical implications of the research*

The empirical chapters of the present thesis carry implications in terms of:

- Recognising the warning signs of potentially problematic SNS use,
- Inclusive online safety interventions, and
- The use of ‘buzz’ words in psychological research.

Firstly, the findings of the present thesis demonstrate the combined influence of SNS users’ offline psycho-social characteristics, online behaviours, and network characteristics. In doing so, the findings indicate several factors that might be viewed as warning signs of potentially problematic SNS use. For instance, the findings from Chapters 4 (p.179) and 5 (p.202) demonstrate how individuals exhibiting offline psychological vulnerability (e.g., lower levels of self-esteem, higher levels of FOMO)



might be prone to engage in risky online connective behaviours (e.g., higher rates of friending and self-disclosure) and may experience exposure to negative online experiences. The results from Chapters 7 (p.249), 8 (p.268), and 9 (p.295) also provide an indication of the characteristics of both networks (e.g., diverse network structures) and individual users and connections (e.g., demographics (age, gender), communication patterns and non-norm profiles) that might be problematic. Building on these findings, the current thesis suggests that SNS users could benefit from more nuanced, and psychologically informative safety education and interventions. Interventions that would allow individuals to identify the offline and online warning signs of potentially problematic use and/or users.

A plethora of online safety initiatives and educational content already exist, often provided by educational establishments, dedicated websites, the SNS platforms (Facebook, 2016), or by third parties (NSPCC, 2016; Safer Internet, 2016; Thinkuknow, 2016). Furthermore, individuals of all ages are routinely exposed to regular coverage in the media (BBC News, 2015; Huffington Post, 2016; Telegraph, 2016), with ‘top tips’ for online safety and scaremongering tales of woe being popular topics of discussion. However, all too often the online safety messages focus predominantly on a ‘don’t do this’ approach to social networking. While messages pertaining to sensible connective behaviours (e.g., don’t share personal pictures with strangers/the general public) might offer practical advice on safely navigating through online life, they rarely focus on the psycho-social factors that might influence those behaviours (e.g., sharing pictures with strangers to gain a boost to an individual’s sense of self-worth and alleviate FOMO).

Therefore, it is recommended that online safety advice and interventions should provide a greater focus on the offline psycho-social warning signs of problematic SNS use. SNS users should be offered a means of gaining a better understanding of how to manage offline self-esteem and FOMO issues, and the potential implications that such vulnerabilities might have in the context of their use of online platforms. By empowering users with the knowledge to spot these offline psycho-social warning signs, online safety interventions, and education would be better facilitating users to identify vulnerability in themselves and/or others, potentially pre-empting problematic online usage that might later manifest. In addition, the findings pertinent to users' online demographic, behavioural, and network characteristics could be used to further expand existing online safety recommendations and advice, by providing more nuanced detail regarding the types of behaviours that might be problematic, users who might be vulnerable and connections who might pose some threat to a user's online life.

Linked to this is an implication highlighted by the research derived from Chapter 6 (p. 225). The findings of this chapter add to our understanding of why some users may not perceive themselves to be vulnerable to negative online experiences. The findings suggest that adult SNS users in particular, exhibit a third-person effect (Davison, 1983) when considering their SNS use and online safety practices against those of an adolescent user. As such, in line with theories of optimistic bias (Dinev & Hart, 2006; Krasnova et al., 2009), some adult SNS users may not consider themselves to: (1) be vulnerable to negative online experiences and/or (2) be the target of existing online safety information. For this reason, the current thesis recommends that more inclusive

online safety interventions should be developed to help foster a greater sense of awareness amongst all online users.

Providing individuals of all age groups with digital literacy pertaining to relevant safe use practices and a greater understanding of both the positive and negative outcomes associated with SNS use is needed. Digital literacy is a complex affair that requires users to master not only the skills required to operate the tools and platforms with which they wish to interact, but also navigate a complex social and psychological landscape in which a myriad of opportunities (both good and bad) abound (Martin & Grudziecki, 2006). There is a growing expectation in 21<sup>st</sup> century Western society for individuals to possess good digital literacy, particularly amongst ‘digital natives’ (Prensky, 2001, see Helsper & Eynon, 2010), the younger generation of online users who have never experienced life without with the technological underpinnings of modern everyday life. It would be wrong of us, however, to assume that merely living in the 21<sup>st</sup> century, whatever the individuals age, qualifies them to be proficient to deal with the psycho-social complexities of online life, in particular the social interactions they will encounter on SNS.

Many current online safety interventions tend to focus on child-related risks and vulnerabilities. While this child-centric approach might indicate that the adults who design and/or implement interventions perceive young people to be using internet technologies more than adults, the abundance of these interventions is in fact more likely due to a desire by adults to ensure that children are equipped with the information and resources required to help them be digitally literate (O’Neill & Barnes, 2008). The apparent concern for an adolescent other demonstrated in this research would appear to support this notion. Furthermore, attempts to safeguard adult

online behaviour and content via inventions can be seen as an attempt to control and/or regulate an individual's right to freedom of expression online (Rowbottom, 2012).

Current emphasis on childhood and adolescent digital literacy and online safety, which in many cases provides examples of good practice for approaching the topic with those age-groups (NSPCC, 2016; Safer Internet, 2016; Thinkuknow, 2016), has the potential to dampen the messages currently designed for users enjoying later stages of life (Stay Safe Online, 2016). It is therefore recommended that all users be given the opportunity to gain a greater understanding of the offline psycho-social predictors of SNS use, online behaviours, and network characteristics to help guide users to make appropriate online decisions. Psychological research, such as that reported in the present thesis, has the ability to aid people (young and old) by increasing their understanding of how offline characteristics can influence online behaviours, network characteristics, and vulnerability perceptions and outcomes. Such information could allow individuals to embrace their digital existences (e.g., on SNS) in a manner that is deemed to be more safe and appropriate to both the psycho-social self and wider society.

Finally, another interesting implication derived from this research concerns the potential impact of inadvertent “buzz words” in academic research. The use of the term FOMO has entered the public conscious in recent years, often being portrayed in the media from a light-hearted and witty perspective (e.g., GQ, 2013; Huffington Post, 2016). This increasingly widespread use of FOMO in this domain is potentially sully the seriousness of the potential implications (both offline and online) of the phenomena. This research demonstrates clearly how FOMO should not be underestimated and potentially disregarded by SNS users as merely a jocular consequence of engaging in online networks. Academic research should endeavour to

pay regard to FOMO with the same rigor and interest that is often invested in other motivational drivers of SNS use and online behaviour (Burke et al., 2011; Ross et al., 2009; Valkenburg et al., 2006). An increased academic presence in the literature would serve to better inform and educate individuals on the potential seriousness of FOMO. With this in mind, researchers in the field, may in time need to consider moving away from using the FOMO acronym in order to project a stronger message in the realms of online research and public safety awareness.

### *10.6 Overall conclusions*

This doctoral research has provided an original contribution to knowledge from both an empirical and methodological perspective. It has enhanced our empirical understanding of online SNS use by demonstrating an original contribution outlining numerous and complex links between offline psycho-social vulnerabilities, SNS use, online connective behaviours, and negative online experiences. In doing so, it has shown how offline psycho-social characteristics such as self-esteem and FOMO have the potential to drive potentially problematic online usage, paving the way for further exploration of such phenomena. The research has also provided an indication of the potential characteristics of the individuals that might be involved in vulnerable online networks (both users and connections) and the perceptions of risk that some SNS users hold. Methodologically, the research has shown that online psychological researchers should not be afraid to move beyond the realms of self-report data. Combining self-report (online surveys and detailed network appraisals) with digitally derived participant SNS metrics, this thesis has explored the topic of negative online experiences using novel and unbiased estimates of a SNS user's digital existence in a manner that has not been evidenced in this field of SNS research previously.

Overall the findings of this thesis suggest that research should embrace the digital age not only from the perspective of it being a highly pertinent field of research but also in its potential for offering novel digitally derived insights into the online behaviours and challenges that we as researchers strive to understand. Furthermore, the research provides an original contribution to the current knowledge and understanding of online life by providing a digitally enhanced perspective of the implications that offline psych-social motivations, online behaviours and user characteristics can have on an individual's online life.

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## **Appendix 1a: list of study advertisement locations**

### **Physical Advertisements:**

- Nottingham Trent University Division of Psychology student bulletin boards
- Nottingham Trent University Graduate School Bulletin Board

### **Online Advertisements:**

- NTU Psych'd Facebook Discussion Group
- NTU Psychology Research Participation Scheme (Online web resource)
- Netmums ([www.netmums.co.uk](http://www.netmums.co.uk))
- Families Online ([www.familiesonline.co.uk](http://www.familiesonline.co.uk))
- Facebook Discussion Groups (Parenting and Local Community/Interest Groups)
- Call for Participants ([www.callforparticipants.co.uk](http://www.callforparticipants.co.uk))

## **Appendix 1b: example request for participation**

My name is Sarah Buglass. I am currently studying towards a PhD in Psychology at Nottingham Trent University. My PhD is looking into the use of online social networks, fear of missing out and potential risks and vulnerabilities that people might encounter online.

I am looking for volunteers to take part in my research. This will involve the completion of a 15 - 20 minute online survey and a short Facebook network task. Participants must be over 18 and currently residing in the UK. The study has received ethical approval from the NTU Ethics Committee.

There will be the opportunity to enter a prize draw offering the chance to win one of four £25 iTunes vouchers on completion of the research.

The survey (and further information) can be accessed by the following link:

<https://edu.surveymoz.com/s3/1532377/SocialNet>

If you have any questions regarding any aspect of the research, please feel free to contact me at [sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)

Thank you for taking the time to read this.

## Appendix 2: ethics documents

### *A2.1 Head of school information letter and consent*



Dear Head Teacher,

I am a Postgraduate Researcher at Nottingham Trent University, working towards a Doctorate in Psychology. As part of my research I am exploring the long term development and use of social networks in adolescents and emerging adults over a period of 12 months. The study has received ethical approval from Nottingham Trent University (Business, Law and Social Sciences Ethics Committee).

I would be extremely grateful if you would take the time to read the following information regarding the project.

#### **Who will conduct the research?**

The research will be conducted by Sarah Buglass, under the guidance of her Director of Studies Dr Jens Binder, at the Division of Psychology, School of Social Sciences, Nottingham Trent University. Sarah Buglass is currently studying towards a Doctorate in Psychology. As a former secondary school Head of ICT, she has 7 years of experience working with young people in a school setting. Sarah Buglass currently holds a valid DBS (Disclosure and Barring) certificate allowing her to work with young people.

#### **What is the aim of the research?**

The main aim of the research is to examine the long term impact of social network site usage on the social development and wellbeing of young people. The study will seek to explore the possible connection between a young person's online attitudes/behaviours, their online vulnerability and the real-world structure/size of their online networks. It is hoped such research will provide a useful tool in shaping future internet safety recommendations.

#### **What would be your schools involvement?**

The school will be asked to identify a cohort of approximately 30 - 60 students in either Year 9 and/or Y12. Students would be required to have Facebook accounts. The first round of data collection is due to commence in approximately March/April 2014, with subsequent data collections planned for September/October 2014 and March/April 2015. Full support in administering the data collection will be provided by the researcher.

Division of Psychology, School of Social Sciences, Nottingham Trent University, Burton Street, Nottingham NG1 4BU.

**Data Collection Methods:**

1. Online survey: This will take approximately 15 - 20 minutes to complete each time and will require each child to have access to a PC and internet connection.
2. Social Network Connections: Students will be asked to voluntarily provide details of the connections they have on a Social Network (i.e. how many friends, who they are and how many of their friends know each other). This data will be collected from individuals via a computer based application. For this stage access to a PC and network access to Facebook will be required (N.B. If network access cannot be arranged alternative arrangements can be provided for this phase).
3. Follow-up network appraisal: Following the core data collection periods a small sample of students may be asked to participate in a follow-up session to discuss their social networking site use and online friending / experiences in further detail. The appraisals could be conducted in person or via email, at the school/college's convenience.

**How will parental consent be gained?**

Participation in this research project is voluntary and greatly appreciated. Information sheets will be provided to the school to send to each parent. The information sheets will outline the aims of the study and the procedures involved. Consent to take part in the study will be via opt-out consent to minimise the workload for the schools involved. However, should you prefer an opt-in method to be implemented a full consent form can be provided for parents to complete.

**What happens to the data collected?**

The data will be analysed by the researcher at Nottingham Trent University. Your school's name and the identity of any child participants will not be used in any reports that are subsequently written. If any child or parent should change their mind and wish to withdraw their data, they will be free to do so at any time before the 31<sup>st</sup> December 2015 without needing to give a reason. If this should occur please rest assured that we will destroy any data collected about the child as part of the study.

**How is confidentiality maintained?**

All data provided will be treated as confidential and will be stored in formats that maintain anonymity. The website that houses the survey and network data will be completely secure and password protected. All survey, network and appraisal data will be stored on a secure, password protected computer to which only the researcher will have access to.

Division of Psychology, School of Social Sciences, Nottingham Trent University, Burton Street, Nottingham NG1 4BU.

I have read and understand the purpose of this research and my school's part in it;

I have asked questions if needed and understand that I can contact the researcher at any time with queries or concerns.

I have the right to withdraw the data pertaining to my school or an individual child at any point during or after the study up until the deadline date and understand that all materials will be destroyed.

I would like the consent of the parents to be collected via:

1. Opt – out consent (i.e. parents to send an email to researcher withdrawing child)

☐

OR

2. Opt – in consent (i.e. all parents to return a signed consent form to the school)

☐

I voluntarily agree to take part in this study.

Head Teacher's Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Date: \_\_\_\_\_

## A2.2 Parent information letter and consent (opt-in)



### Participant Information Form

Dear Parent / Guardian,

Your child's school has agreed to take part in a project about the use and impact of online social network sites in secondary school age children. The research project will help us to understand the social networking habits of young people and the associated issues that may affect their wellbeing. Please take time to read the following information carefully and decide whether or not you would like your child to take part.

#### Who will conduct the research?

The research will be conducted by Sarah Buglass, under the guidance of her Director of Studies Dr Jens Binder, at the Division of Psychology, School of Social Sciences, Nottingham Trent University. Sarah Buglass is currently studying towards a PhD in Psychology. As a former secondary school Head of ICT, she has 7 years of experience working with young people in a school setting. Sarah Buglass currently holds a valid DBS (Disclosure and Barring) certificate allowing her to work with young people.

#### What is the aim of the research?

The main aim of the research is to examine the long term impact of social network site usage on the social development and wellbeing of young people. The study will seek to explore the possible connection between a young person's online attitudes/behaviours, their online vulnerability and the real-world structure/size of their online networks. It is hoped such research will provide a useful tool in shaping future internet safety recommendations.

#### What will your child be required to do?

Your child will be asked to take part in a series of short research tasks at 6 monthly intervals over a period of 12 months. The tasks will involve:

- 1) Online Survey: A short survey (15 minute) about their everyday social networking habits (e.g. how often they use social networks) and how they feel about themselves.
- 2) Social Network Data: Your child will be asked to voluntarily provide details of the connections they have on a Social Network (i.e. how many friends, who they are and how many of their friends know each other). This data will be collected via a computer based application.

- 3) Follow-up network appraisal: A small number of children will be asked to participate in a follow-up activity during which they will be asked to discuss their use of social networks and online connections in more depth.

**What happens to the data collected?**

The data will be analysed by the researcher at Nottingham Trent University. Your child's name or any identifiable data will not be used in any reports that are subsequently written.

**How is confidentiality maintained?**

All data provided will be treated as confidential and will be stored in formats that maintain their anonymity. The website that houses the survey and network data will be completely secure and password protected. All survey, network and appraisal data will be stored on a secure, password protected computer to which only the researcher will have access to.

**What happens if I do not want my child to take part?**

Participation in this research project is voluntary and greatly appreciated. If you are happy for your child to take part then please return the consent form to your child's school by Friday 26<sup>th</sup> April 2014.

If you decide to take part and then change your mind, you are free to withdraw your child from the study at any time before 31<sup>st</sup> December 2015, without needing to give a reason. This can be done by emailing the names of your child and their school to the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)). If you do this please rest assured that we will destroy any data collected about your child as part of the study.

**How can I find out more about this project and its results?**

If you have any questions or concerns before, during or after your child's participation in this research, please do not hesitate to contact the researcher or her supervisor. Contact details, are on the bottom of this form.

Thank you for agreeing to consider participating in this research project.

**Researcher:** Sarah Buglass  
PhD Researcher Psychology  
E-mail: [sarah.buglass2012@ntu.ac.uk](mailto:sarah.buglass2012@ntu.ac.uk)

**Supervisor:** Dr Jens Binder Tel. 0115 848 2416

Division of Psychology  
School of Social Sciences  
Nottingham Trent University  
Burton Street,  
Nottingham NG1 4BU

Division of Psychology, School of Social Sciences, Nottingham Trent University, Burton Street, Nottingham NG1 4BU.



***Agreement for Parental / Guardian Consent***

I have read and understand the purpose of this research and my child's part in it;

I have asked questions if needed and understand that I can contact the researcher at any time with queries or concerns.

I have the right to withdraw the data pertaining to my child at any point during or after the study up until the deadline date and understand that all materials will be destroyed.

I voluntarily agree to my child taking part in this study.

Name of Child: \_\_\_\_\_

Class: \_\_\_\_\_

Name of School: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

### A2.3 Parent information letter and consent (opt-out)



#### **Participant Information Form**

Dear Parent / Guardian,

Your child's school has agreed to take part in a project about the use and impact of online social network sites in secondary school age children. The research project will help us to understand the social networking habits of young people and the associated issues that may affect their wellbeing. Please take time to read the following information carefully and decide whether or not you would like your child to take part.

#### **Who will conduct the research?**

The research will be conducted by Sarah Buglass, under the guidance of her Director of Studies Dr Jens Binder, at the Division of Psychology, School of Social Sciences, Nottingham Trent University. Sarah Buglass is currently studying towards a PhD in Psychology. As a former secondary school Head of ICT, she has 7 years of experience working with young people in a school setting. Sarah Buglass currently holds a valid DBS (Disclosure and Barring) certificate allowing her to work with young people.

#### **What is the aim of the research?**

The main aim of the research is to examine the long term impact of social network site usage on the social development and wellbeing of young people. The study will seek to explore the possible connection between a young person's online attitudes/behaviours, their online vulnerability and the real-world structure/size of their online networks. It is hoped such research will provide a useful tool in shaping future internet safety recommendations.

#### **What will your child be required to do?**

Your child will be asked to take part in a series of short research tasks at 6 monthly intervals over a period of 12 months. The tasks will involve:

- 1) Online Survey: A short survey (15 minute) about their everyday social networking habits (e.g. how often they use social networks) and how they feel about themselves.
- 2) Social Network Data: Your child will be asked to voluntarily provide details of the connections they have on a Social Network (i.e. how many friends, who they are and how many of their friends know each other). This data will be collected via a computer based application.
- 3) Follow-up network appraisal: A small number of children will be asked to participate in a follow-up activity during which they will be asked to discuss their use of social networks and online connections in more depth.

Division of Psychology, School of Social Sciences, Nottingham Trent University, Burton Street, Nottingham NG1 4BU

**What happens to the data collected?**

The data will be analysed by the researcher at Nottingham Trent University. Your child's name or any identifiable data will not be used in any reports that are subsequently written.

**How is confidentiality maintained?**

All data provided will be treated as confidential and will be stored in formats that maintain their anonymity. The website that houses the survey and network data will be completely secure and password protected. All survey, network and appraisal data will be stored on a secure, password protected computer to which only the researcher will have access to.

**What happens if I do not want my child to take part?**

Participation in this research project is voluntary and greatly appreciated. If you are happy for your child to take part you do not need to do anything. However, if you do not wish your child to take part then please email the researcher with the name of your child and their school at [sarah.buglass2012@ntu.ac.uk](mailto:sarah.buglass2012@ntu.ac.uk) by Friday 26<sup>th</sup> April 2014.

If you decide to take part and then change your mind, you are free to withdraw your child from the study at any time before 31<sup>st</sup> December 2015, without needing to give a reason. If you do this please rest assured that we will destroy any data collected about your child as part of the study.

**How can I find out more about this project and its results?**

If you have any questions or concerns before, during or after your child's participation in this research, please do not hesitate to contact the researcher or her supervisor. Contact details, are on the bottom of this form.

Thank you for agreeing to consider participating in this research project.

**Researcher:** Sarah Buglass  
PhD Researcher Psychology  
E-mail: [sarah.buglass2012@ntu.ac.uk](mailto:sarah.buglass2012@ntu.ac.uk)  
**Supervisor:** Dr Jens Binder Tel. 0115 848 2416  
E-mail: [jens.binder@ntu.ac.uk](mailto:jens.binder@ntu.ac.uk)

Division of Psychology  
School of Social Sciences  
Nottingham Trent University  
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Nottingham NG1 4BU.



You are free to withdraw at any time until 31<sup>st</sup> December 2015 by emailing your username to the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)) or her supervisor ([jens.binder@ntu.ac.uk](mailto:jens.binder@ntu.ac.uk)).

**Participant Prize Draw:**

In return for your participation in this study you will have the option to be entered into a prize draw to win one of four £25 iTunes vouchers. Withdrawal of data will not affect your prize draw entry.

Psychology students at NTU will also receive 2 research credits.

**Consent:**

Please note that you must be aged between [enter age / criteria for panel] years old and a resident in the UK in order to complete this questionnaire.

I agree that I have read and understood the information about the study ☐

I hereby give my consent to participate in the study ☐

Please enter a Unique Username:

(Your username will be unique to you. You will use this username in all stages of this research. Please make a note of your username for future use.)

### *A2.5 Online survey debrief (school-based adolescents)*

**Thank you** very much for completing this questionnaire, which is designed to examine social networking behaviour, online connections and attitudes towards online vulnerability.

The researcher will be in contact with you in approximately **6 months** to invite you to take part in the next phase of the research.

If you require further information about the study please do not hesitate to contact your teacher or the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)).

If you have been affected by issues raised by the questions, you may find it helpful to talk to your teacher, school counsellor/child protection officer.

Additionally, if you would like to gain more information or support about any of these topics, you might want to visit the following websites:

Cyber Bullying: National Bullying

Helpline <http://www.nationalbullyinghelpline.co.uk/> or Child

Line (<http://www.childline.org.uk/Explore/Bullying/Pages/online-bullying.aspx> )

Internet Safety CEOP: [http://www.thinkuknow.co.uk/11\\_16/](http://www.thinkuknow.co.uk/11_16/)

Kidsmart: <http://www.kidsmart.org.uk/>

Wellbeing Young

Minds: [http://www.youngminds.org.uk/for\\_children\\_young\\_people](http://www.youngminds.org.uk/for_children_young_people)

All data collected during this study will be kept confidential. You are free to withdraw until 31<sup>st</sup> December 2015 by emailing your username to the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)).

Any further questions regarding the study should be sent to the email address above, or to the project supervisor: [jens.binder@ntu.ac.uk](mailto:jens.binder@ntu.ac.uk).

**Please close the web browser to end your session.**



#### *A2.6 Online survey debrief (university and online adults)*

**Thank you** very much for completing this questionnaire, which is designed to examine social networking behaviour, online connections and attitudes towards online vulnerability.

The researcher will be in contact with you in approximately **6 months** to invite you to take part in the next phase of the research.

If you require further information about the study please do not hesitate to contact the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)).

If you have been affected by issues raised by the questions, you may find it helpful to talk to a trained counsellor or your GP.

Additionally, if you would like to gain more information or support regarding Internet Safety you might want to visit the following websites:

National Crime Prevention Council <http://www.ncpc.org/topics/internet-safety>  
Safer Internet Centre <http://www.saferinternet.org.uk/>  
Metropolitan Police Cyber Safety  
Advice [http://safe.met.police.uk/internet\\_safety/get\\_the\\_facts.html](http://safe.met.police.uk/internet_safety/get_the_facts.html)

All data collected during this study will be kept confidential. You are free to withdraw until 31<sup>st</sup> December 2015 by emailing your username to the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)).

Any further questions regarding the study should be sent to the email address above, or to the project supervisor: [jens.binder@ntu.ac.uk](mailto:jens.binder@ntu.ac.uk).

## *A2.7 Social network appraisal information and consent (face to face)*

### **Social Networking Study: Social Network Appraisal Information and Consent**

Thank you for recently completing the Social Networking Survey. We would now like to invite you to take part in a follow-up interview-style session to find out more about your online networks. Please take time to read the following information carefully. Please feel free to ask any questions.

#### **Purpose**

The aim of the follow-up is to gain a greater understanding of how and why you use social networking, the friends you connect to and the experiences you have whilst online.

#### **What will the session involve?**

The session will last approximately 30 minutes. During this time, you will be asked to respond to a series of questions regarding your use of social networking, the experiences you have had whilst online and your views on the use of social networks by others.

During the session, you will also be asked to elaborate on the data you have submitted previously regarding your online connections. For this section, you will have the opportunity to gain access to your Facebook profile to help provide a point of reference for your discussions with the researcher (optional). You will then be asked to complete a table of ratings pre-populated with your connections. *Please note:* The researcher will not ask to view your Facebook profile or have direct access to it at any time during the session.

#### **Consent**

Participation in this session is voluntary and you are free to withdraw your consent at any time up until 31<sup>st</sup> December 2015\* without giving reasons. Any data used from this interview during the analysis or publication of the project, will be done so in an anonymised format. Only the researcher in this project will have access to identifiable data. Taking part in this session should not cause you any risk or discomfort.

During the session, should you disclose any sensitive information regarding potential or actual criminal activity or harm to yourself or a 3<sup>rd</sup> party, the researcher has a duty to report it to the relevant authorities.

I hereby give my consent to participate in the follow-up session. In doing so I confirm that, I have been informed of the ethical principles underlying the research.

Signed:

Print Name:

Date:

\*Once data has been published it will not be possible to extract individual data from the project.

For more information or to withdraw your data please contact the researcher Sarah Buglass [sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk) or her Director of Studies Dr Jens Binder ([jens.binder@ntu.ac.uk](mailto:jens.binder@ntu.ac.uk)).



## *A2.8 Social network appraisal information and consent (online adult participants)*

### **Social Networking Study: Social Network Appraisal Information and Consent**

Thank you for recently completing the Social Networking Survey. We would now like to invite you to take part in a follow-up network appraisal. Please take time to read the following information carefully. Please feel free to email the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)) with ask any questions you may have.

#### **Purpose**

The aim of the follow-up appraisal is to gain a greater understanding of how and why you use social networking, the connections you have made and the experiences you have whilst online.

#### **What will the activity involve?**

The appraisal activity will be conducted via an online form on a secure website. It will take approximately 30 minutes to complete. During this time you will be asked to respond to a series of questions regarding your use of social networking, the experiences you have had whilst online and your views on the use of social networks by others.

During the interview you will also be asked to elaborate on the data you have submitted previously regarding your online connections. You will be provided with a table of your online connections that you previously submitted in order to facilitate rating your interactions with them. You may wish to use your Facebook profile as a point of reference during the activity (optional).

#### **Consent**

Participation in this activity is voluntary and you are free to withdraw your consent at any time\* up until 31<sup>st</sup> December 2015 without giving reasons. Any data used from this appraisal used during the analysis or publication of the project, will be done so in an anonymised format. Only the researcher in this project will have access to identifiable data. Taking part in this appraisal activity should not cause you any risk or discomfort.

During the appraisal, should you disclose any sensitive information regarding potential or actual criminal activity or harm to yourself or a 3<sup>rd</sup> party, the researcher has a duty to report it to the relevant authorities.

I hereby give my consent to participate in the follow-up appraisal. In doing so I confirm that I have been informed of the ethical principles underlying the research.

Signed:

Print Name:

Age:

Date:

\*Once data has been published it will not be possible to extract individual data from the project.

For more information or to withdraw your data please contact the researcher Sarah Buglass [sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk) or her Director of Studies Dr Jens Binder ([jens.binder@ntu.ac.uk](mailto:jens.binder@ntu.ac.uk)).

## *A2.9 Appraisal debrief (school-based adolescents)*

**Thank you** very much for participating in this follow-up interview, which is designed to examine your social networking behaviour and your attitudes towards online vulnerability.

Please be assured that any views or opinions that you have expressed during the interview process will remain confidential. Should data from your interview be used during the publication phase of this project your identity will remain anonymous.

The researcher will be in contact with you in approximately **6 months** to invite you to take part in the next phase of the research.

If you require further information about the study please do not hesitate to contact the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)).

If you have been affected by issues raised by the questions, you may find it helpful to talk to your teacher, school counsellor/child protection officer.

Additionally, if you would like to gain more information or support about any of these topics, you might want to visit the following websites:

Cyber Bullying: National Bullying Helpline <http://www.nationalbullyinghelpline.co.uk/> or Child Line (<http://www.childline.org.uk/Explore/Bullying/Pages/online-bullying.aspx> )

Internet Safety CEOP: [http://www.thinkuknow.co.uk/11\\_16/](http://www.thinkuknow.co.uk/11_16/)

Kidsmart: <http://www.kidsmart.org.uk/>

Wellbeing Young Minds: [http://www.youngminds.org.uk/for\\_children\\_young\\_people](http://www.youngminds.org.uk/for_children_young_people)

All data collected during this study will be kept confidential. You are free to withdraw until December 31<sup>st</sup> 2015 by emailing your username to the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)).

Any further questions regarding the study should be sent to the email address above, or to the project supervisor: [jens.binder@ntu.ac.uk](mailto:jens.binder@ntu.ac.uk).

## *A2.10 Appraisal debrief (university / online adults)*

**Thank you** very much for participating in this follow-up network appraisal, which is designed to examine your social networking behaviour, interactions with online connections and your attitudes towards online vulnerability.

Please be assured that any views or opinions that you have expressed during the appraisal process will remain confidential. Should data from your appraisal be used during the publication phase of this project your identity will remain anonymous.

The researcher will be in contact with you in approximately **6 months** to invite you to take part in the next phase of the research.

If you require further information about the study please do not hesitate to contact the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)).

If you have been affected by issues raised by the questions, you may find it helpful to talk to a trained counsellor or your GP.

Additionally, if you would like to gain more information or support regarding Internet Safety you might want to visit the following websites:

National Crime Prevention Council <http://www.ncpc.org/topics/internet-safety>

Safer Internet Centre <http://www.saferinternet.org.uk/>

Metropolitan Police Cyber Safety Advice  
[http://safe.met.police.uk/internet\\_safety/get\\_the\\_facts.html](http://safe.met.police.uk/internet_safety/get_the_facts.html)

All data collected during this study will be kept confidential. You are free to withdraw until December 31<sup>st</sup> 2015 by emailing your username to the researcher ([sarah.buglass2012@my.ntu.ac.uk](mailto:sarah.buglass2012@my.ntu.ac.uk)).

Any further questions regarding the study should be sent to the email address above, or to the project supervisor: [jens.binder@ntu.ac.uk](mailto:jens.binder@ntu.ac.uk).

## Appendix 3: online survey (all items and instructions)

### General Demographics:

Please enter your age in years:

Gender: male /female

Do you have a profile on Facebook? Yes/No (survey defaults to standard Thank You message if no profile)

### Social Networking Use

Do you consider Facebook to be your primary Social Networking Site? Yes/No

How long have you had a Facebook profile? (In Years)

How do you most commonly access your Facebook profile?

Computer	Smart Phone	Tablet

On an average day how long do you spend using Facebook?

0-15 minutes	15 – 30 minutes	31 – 45 minutes	46 – 60 minutes	Over an hour
1	2	3	4	5

How frequently do you log out of Facebook?

At the end of every session.	Most Sessions	Sometimes	Rarely	Never. Facebook is always running in the background
1	2	3	4	5

## Why do you use Facebook?

Please rate the following statements:

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree Nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
To keep in touch with old friends and acquaintances	1	2	3	4	5
To communicate with my current friends	1	2	3	4	5
To see what other people are doing in their lives	1	2	3	4	5
To find out information about people I have met socially	1	2	3	4	5
To share information about my life	1	2	3	4	5
Because my friends use it	1	2	3	4	5

## Facebook Friends

**Network Size:** How many people are you connected to on Facebook? (please estimate)  
[FREE TEXT RESPONSE]

Thinking about your Facebook friends, please indicate the type of people that you are connected to (tick all that apply):

Parents		Children*		Spouse / Romantic Partner*	
Siblings		Grandparents		Other Family	
Best friend		Friends		Previous Teachers/Lecturers	
Current Classmate		Previous Co-workers*		Current Teachers/Lecturers	
Previous Classmate		Current Co-workers*		Childhood Friends	
Neighbours		Leisure / Interest Group Members		Friends of Friends	
Casual Acquaintances		Online only friends		Celebrities / Public Figures	

\*Adult questionnaire only

## Facebook Privacy

Who can view your Facebook profile?

Anyone	Only Friends	I have different settings for different parts of my profile	Don't know
1	2	3	4

## Sharing Information

Think about your Facebook profile. Does your profile contain the following information?

	Yes	No
Status updates		
Picture(s) of yourself		
Picture(s) of your family and friends		
Pictures of your school / workplace		
Pictures of your home		
Personal videos		
Your Email address		
Your Phone / Mobile Number		
Your hometown / current location		
Your relationship status		
The name of your school / workplace		
Your education / work history		
Events you are going to		
Your interests		
Important life events (e.g. births, marriages, anniversaries)		

## Sharing Information

When you are sharing information on your Facebook profile, how willing are you to disclose information about:

	Not at all willing				Very Willing
My day to day life	1	2	3	4	5
Things I have done which I feel guilty about	1	2	3	4	5
Things I wouldn't say or do in public	1	2	3	4	5
My deepest feelings	1	2	3	4	5
What I like and dislike about myself	1	2	3	4	5
What I like and dislike about others	1	2	3	4	5

What is important to me in life	1	2	3	4	5
What makes me the person I am	1	2	3	4	5
My worst fears	1	2	3	4	5
Things I have done which I am proud of	1	2	3	4	5
My close relationships with other people	1	2	3	4	5
Things that anger me	1	2	3	4	5

## Personal Online Safety

Think about the information that you regularly share on Facebook. How concerned are you that the information that you share on Facebook might:

	No Concern				Strong Concern
be misused by others	1	2	3	4	5
be used against me	1	2	3	4	5
cause conflicts with my family	1	2	3	4	5
cause conflicts with my friends	1	2	3	4	5
cause me problems if future employers ever saw it	1	2	3	4	5
attract unwanted attention from strangers	1	2	3	4	5
be judged unfairly by others	1	2	3	4	5
make you regretful in the future	1	2	3	4	5
get me into trouble with the law	1	2	3	4	5
be seen by people you do not know	1	2	3	4	5

## Personal Online Safety

When using Facebook how frequently have you personally experienced or seen others encounter:

	<b>Very Rarely</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Often</b>	<b>Very Often</b>
Critical or hurtful comments	1	2	3	4	5
Social embarrassment	1	2	3	4	5
Damaging gossip and rumours	1	2	3	4	5
Personal information being misused (i.e. shared without permission)	1	2	3	4	5
Content of a sexual or violent nature.	1	2	3	4	5
Unwanted advances, stalking or harassment online.	1	2	3	4	5

## Online safety of others

Please read the following short scenario:

Alex is 14 and has been a regular user of Facebook for the past 6 months. Alex usually uses a smartphone to access Facebook, but also has access to the family laptop after school and at weekends. Now imagine that Alex is (one of your friends) / (a teenage child of one of your friends).

How concerned would you be that the information that Alex shares on Facebook might:

	<b>No Concern</b>				<b>Strong Concern</b>
be misused by others	1	2	3	4	5
be used against Alex	1	2	3	4	5
cause conflicts with Alex's family	1	2	3	4	5
cause conflicts with Alex's friends	1	2	3	4	5
cause Alex problems if future employers ever saw it	1	2	3	4	5
attract unwanted attention from strangers	1	2	3	4	5
be judged unfairly by others	1	2	3	4	5
make Alex regretful in the future	1	2	3	4	5



get Alex into trouble with the law	1	2	3	4	5
be seen by people Alex does not know	1	2	3	4	5

### **Fear of Missing Out (Przybylski et al., 2013)**

Below is a collection of statements about your everyday experience. Using the scale provided please indicate how true each statement is of your general experiences. Please answer according to what really reflects your experiences rather than what you think your experiences should be.

Please treat each item separately from every other item.

	Not at all true of me	Slightly true of me	Moderately true of me	Very true of me	Extremely true of me
I fear others have more rewarding experiences than me.	1	2	3	4	5
I fear my friends have more rewarding experiences than me.	1	2	3	4	5
I get worried when I find out my friends are having fun without me.	1	2	3	4	5
I get anxious when I don't know what my friends are up to.	1	2	3	4	5
It is important that I understand my friends "in jokes."	1	2	3	4	5
Sometimes, I wonder if I spend too much time keeping up with what is going on.	1	2	3	4	5
It bothers me when I miss an opportunity to meet up with friends.	1	2	3	4	5
When I have a good time it is important for me to share the details online (e.g. updating status).	1	2	3	4	5
When I miss out on a planned get together it bothers me.	1	2	3	4	5
When I go on vacation, I continue to keep tabs on what my friends are doing.	1	2	3	4	5

## Self Esteem (Rosenberg, 1965)

Think about how you normally feel on a day to day basis. Please rate the following statements:

	Strongly agree	Agree	Disagree	Strongly Disagree
On the whole, I am satisfied with myself.	1	2	3	4
At times I think I am no good at all.	1	2	3	4
I feel that I have a number of good qualities.	1	2	3	4
I am able to do things as well as most other people.	1	2	3	4
I feel I do not have much to be proud of.	1	2	3	4
I certainly feel useless at times.	1	2	3	4
I feel that I'm a person of worth.	1	2	3	4
I wish I could have more respect for myself.	1	2	3	4
All in all, I am inclined to think that I am a failure.	1	2	3	4
I take a positive attitude toward myself.	1	2	3	4

## Appendix 4: digital data task

Thank you for completing **Part 1** of the Social Networking Study.

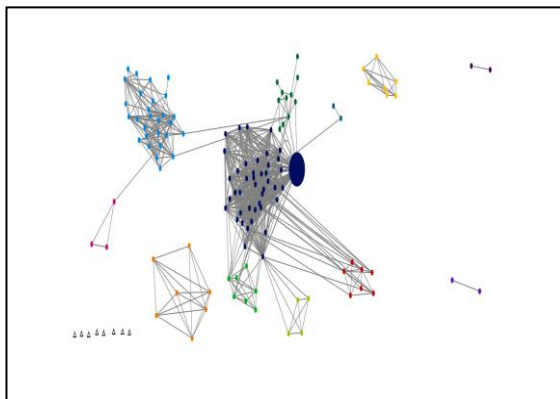
We would now like to invite you to take part in **Part 2** of the study.

### What does it involve?

An exciting area of Social Network research involves the generation of graphs and statistics based upon friendship networks. It is the aim of the researcher to use this technique to analyse possible associations between online friendship and user behaviour / experiences on Facebook.

You will be asked to provide additional details of your Facebook connections (i.e. how many friends, who they are and how many of your friends know each other). This data will be collected via a computer based application and will require you to have access to Facebook.

### Exemplar Social Network Graph: File:



### Exemplar Social Network Data

```
File Edit Format View Help
99,601111953511454391,531697594511454391,560000747511454391,5895314635121447,
95766380554501239,554725860554501239,56118185554501239,567552754554501239,57
33501202599,665742945511454391,645092950511454391,645681919511454391,78919764
48531200,772584174548531200,820115433548531200,821659500554501239,62499295455
2754,655543272567552754,690560117567552754,702881194567552754,780972572567552
65916953598415597,712637586598415597,730336648598415597,741841163598415597,
29080669,1092462318529080669,1133281921534686230,103314147534686230,10338288
0595819441554725860,100001237720965554725860,100002179826990556818083,1441481
0228558011581888779,112824994581888779,1345983049581888779,13960996935818887
16130,1343567774612416130,141500744612416130,1516890291612416130,15982015914
5543272,821659500665742945,694531469670895545,698780763670895545,746748209676
5624992954,100002057726644624992954,100002179826990632672143,1001566617632672
93655543272,1415005744655543272,1516890291655543272,1614210196655543272,17956
07705984487,1396698693712637586,1285715295730336648,1285715295730336648,1000
```

This will take approximately **5 minutes** to complete.

**PLEASE NOTE:** Please be assured that all data collected in this phase will be fully anonymised (i.e. it will not contain your name or the names of your friends) once it has been submitted to the researcher. The data collected is based on publicly available Facebook information (i.e. the information you would normally agree to submit to an application or group page on Facebook as standard)).

For this section of the study you will require access to your Facebook account and a device (i.e. a PC, tablet or smartphone) that is capable of saving a text file temporarily.

**Please note:** If you do not wish to provide data for Part 2 you may still take part in the study by completing Part 1 Only.

### Do you consent to proceed to Part 2 of the study?

Yes ☐

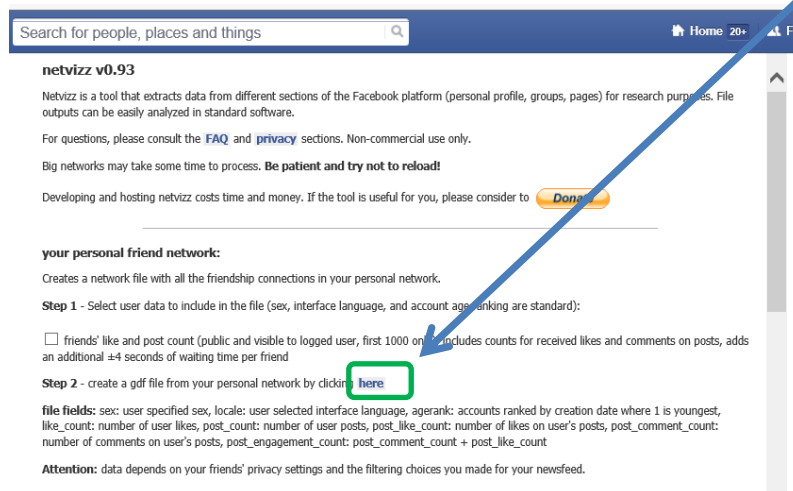
No (Please Use My Part 1 Questionnaire Data

☐

## Part 2: Your Facebook Network

Please be assured that the data collected from you is **publicly available** data supplied by Facebook. The data will not compromise your privacy or that of your connections. All data submitted to the researcher will be fully anonymised (i.e. any names will be removed) and held securely.

1. Click on the following link <https://apps.facebook.com/netvizz/> This should open the data collection application in a new web-browser.
2. Sign in to Facebook and agree to the Netvizz Application's access terms. (**Please note:** This application **does not store** any of your data and is for **research purposes only**)
3. You will see the following screen. Click on the 'here' link (highlighted)



4. It may take a few moments to load your network connections. Right click on the gdf file link (highlighted) and save to your device.

netvizz v0.93

getting connections (142):  
0 50 100

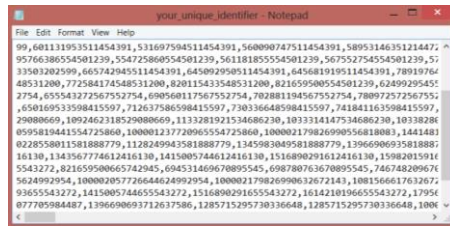
**download**

142 nodes, 755 edges

Your [gdf file](#) (right click, save as...).

Your [tab file](#) (right click, save as...).

(**Please note:** You are now saving a small text based file to your device that holds **only** a list of friend identifiers and their gender)



Example GDF file content.

5. Browse for your .gdf file and upload it to submit to the researcher here:

Browse

Submit

If you are not able to submit this data please click the next button to proceed.

## Further Research (UNIVERSITY AND ADULTS ONLY)

This study is part of a 12-month research project into online social networking. If you are happy to complete further surveys and/or take part in follow-up interviews for this research please provide your email address below, so that the researcher may invite you to take part.

Email:

## Appendix 5: social network appraisal

**Quantitative Follow-up Data (based on previous literature by: Manago et al.,(2012); Vangelisti & Caughlin, 1997):**

a. Please review the list of your Facebook friends below. For each friend please indicate how you know them,

<i>Friend Name</i>	<i>How do you know this person?</i>	<i>Gender</i>	<i>Approximate Age</i>	<i>Full Access to Your Profile (Privacy Settings)</i>	<i>How often do you communicate with this person on Facebook?</i>	<i>How often do you communicate with this person offline?</i>	<i>How close do you feel to this person?</i>	<i>How frequently is this person involved in disagreement online? (with self or others)</i>
A Friend	Friend of Friend	F	45	N	Never	Yearly	Not at all close	Sometimes

***Drop-Down Menu Options (for online version) / Options provided during appraisal***

- *How do you know this person?* Parent | Child | Spouse / Romantic Partner | Sibling | Grandparent | Other Family | Best Friend | Friend | Teacher/Lecturer (Past/Present) | Classmate (Past/Present) | Co-worker (Past / Present) | Childhood Friend | Neighbour | Leisure/Interest Group Member | Friend of Friend | Casual Acquaintance | Online Only Friend | Celebrity / Public Figure | Other
- *Gender:* Male | Female (digitally derived)
- *Approximate Age:* [Input by Participant]
- *Full Access to Your Profile:* Yes | No
- *How often do you communicate with this person on Facebook?* Never | Yearly | Monthly | Weekly | Daily
- *How often do you communicate with this person offline?* Never | Yearly | Monthly | Weekly | Daily
- *How close do you feel to this person?* Not at all close | Somewhat close | Close | Very Close

- *How frequently is this person involved in disagreement online? (with self or others)* Never | Not very often | Sometimes | Often| Very often

**Open ended questions (written text-based responses):**

Why do you use Facebook?

What do you like about Facebook?

What do you dislike about Facebook?

What do you think are the main risks to you of using Facebook?

What specific feature(s) of Facebook poses the most risks?

When you share information on Facebook, who do you think looks at that information (imagined audience)?

Thinking about your Facebook friends... Who do you feel are the most important people on your Friends list? Why?

What advice would you give to a young person about using Facebook?

If Facebook shut down tomorrow (if you could not access Facebook), would it impact on your life?

If you were to experience or encounter something on Facebook that made you feel upset or uncomfortable what would you do?

## Appendix 6: Evaluative overview of digital data extraction applications

Application	Software Overview	Advantages	Disadvantages
NodeXL ( <a href="http://nodexl.codeplex.com/">http://nodexl.codeplex.com/</a> )	NodeXL is an add-on for Microsoft's Excel package that has been developed by the Social Media Research Foundation (2013). It is an open source application compatible with versions of Excel from 2007 onwards. Used in conjunction with a specific Facebook module, which must be downloaded and installed separately, it enables researchers to extract a plethora of information regarding an individual's Facebook network.	<ul style="list-style-type: none"> <li>✓ Datasets are downloaded into a format ready for social network analysis</li> <li>✓ Requires user consent</li> <li>✓ Free</li> </ul>	<ul style="list-style-type: none"> <li>✗ Must be used locally by each participant (i.e., Excel and NodeXL required at each point of data collection)</li> <li>✗ Downloaded data can contain highly identifiable and personal information</li> </ul>
Wolfram ( <a href="https://www.wolframalpha.com/">https://www.wolframalpha.com/</a> )	Wolfram is a data analytics website that uses the Facebook API to produce highly detailed reports for individual users containing information and	<ul style="list-style-type: none"> <li>✓ Requires user consent</li> <li>✓ Intuitive</li> </ul>	<ul style="list-style-type: none"> <li>✗ Fee payable by each individual user</li> <li>✗ Downloaded data contains highly</li> </ul>



	statistics based upon their Facebook profiles and usage.	✓ Statistical and graphical analysis of user networks contained in each report	identifiable and personal information ✗ Mutual data lists not easily transferable for analysis
Netvizz ( <a href="https://apps.facebook.com/netvizz/">https://apps.facebook.com/netvizz/</a> )	Netvizz is a Facebook application created for research purposes by Rieder (2013). The application allows individual Facebook users to access and download their mutual Facebook friendship lists as a readable text file. The resultant data file contains two columns showing all of the available nodes (alters) in the network and the alters that they are connected to. Facebook users who have set high privacy permissions are not captured by the application.	<ul style="list-style-type: none"> <li>✓ Free</li> <li>✓ Intuitive</li> <li>✓ Requires user consent</li> <li>✓ Data file is easily transferable to SNA analysis tools</li> <li>✓ Has been used in previous research</li> <li>✓ Unique identifiers for each Facebook friend present in data files</li> <li>✓ Information not stored by application</li> </ul>	✗ Can be slow to process large networks

Give Me My Data ( <a href="https://apps.facebook.com/give-me-my-data">https://apps.facebook.com/give-me-my-data</a> )	<p>Give me my Data is a Facebook application that is designed to provide users with a backup of their profile data. The user can access and backup a host of information from their profile including their friendship list, a mutual friendship list, tags, links, and photos.</p> <p>The application provides the user with options for generating data suitable for different file formats, i.e., .csv, .txt, .py. Whilst such a feature is useful in terms of providing data in formats that might be more readily usable with later SNA software applications, this is negated by the requirement of users to actually create and save the files in the format themselves. The application assumes that users will have the prerequisite knowledge required to create a new file, copy, and paste a body of text and then save it into the appropriate file format.</p>	<ul style="list-style-type: none"> <li>✓ Free</li> <li>✓ User consent required</li> <li>✓ Information not stored by application</li> </ul>	<ul style="list-style-type: none"> <li>✗ Does not provide a way of distinguishing between two users of the same name (no unique identifiers)</li> <li>✗ Labour intensive for the participant</li> <li>✗ Assumes IT knowledge</li> </ul>
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## 0Appendix 7: Confirmatory factor analysis (CFA) of self-reported scales

### A7.1 FOMO scale

Previous theoretical applications of the FOMO scale have utilised a one-factor model (Przybylski et al., 2013). On this basis, CFA was used to test a one-factor model of FOMO. All FOMO scale items were square root transformed prior to CFA to ensure data normality, as raised levels of kurtosis ( $>.20$ ) were evident for item four<sup>3</sup>. Initially the model demonstrated a poor fit,  $\chi^2(35) = 631.74$ ,  $p < .001$ ; CFI = .76, RMSEA = .19 [.17, .20], TLI = .69, SRMR = .01. Modification indices suggested covariation between some items (1 and 2, 7 and 9). A second CFA testing the co-varied model produced a reasonable fit to the data,  $\chi^2(33) = 133.03$ ,  $p < .001$ . CFI = .96, RMSEA = .08 [.07, .09], TLI = .94, SRMR = .00, and was a significantly better fit to the data,  $\Delta\chi^2(2) = 498.71$ ,  $p < .001$ . All items loaded significantly onto the factor (Table A7.1), with 7 out of the 10 demonstrating strong coefficients ( $>.60$ ; Hair et al., 1998; Field, 2005). Scale reliability tests indicated good internal consistency for the unidimensional construct ( $\alpha = .88$ ).

Table A7.1: CFA derived item loadings for the unidimensional FOMO scale

Item	B [95% BCI]	$\beta$	SE
1. I fear others have more rewarding experiences than me	1.00 [1.00, 1.00]	.60***	.04
2. I fear my friends have more rewarding experiences than me	1.07 [.98, 1.16]	.65***	.04
3. I get worried when I find out my friends are having fun without me	1.38 [1.23, 1.57]	.79***	.08

<sup>3</sup> CFA was performed on both untransformed and transformed data. The factor loadings for the FOMO scale were comparable across the analyses. Model fit was improved with the normalised data.

4. I get anxious when I don't know what my friends are up to	1.03 [.88, 1.21]	.72***	.08
5. It is important that I understand my friends in jokes	1.22 [1.05, 1.45]	.69***	.09
6. Sometimes, I wonder if I spend too much time keeping up with what is going on	1.01 [.84, 1.19]	.60***	.08
7. It bothers me when I miss an opportunity to meet up with friends	1.16 [.97, 1.39]	.63***	.10
8. When I have a good time it is important for me to share the details online (e g updating status)	.98 [.81, 1.20]	.57***	.09
9. When I miss out on a planned get together it bothers me	1.28 [1.09, 1.52]	.70***	.10
10. When I go on vacation, I continue to keep tabs on what my friends are doing	1.02 [.82, 1.24]	.60***	.10

---

$\beta$  = standardised; \*\*\* $p < .001$

### *A7.2 Self-disclosure scale*

Original and adapted versions of the self-disclosure scale (Miller et al., 1983; Trepte & Reinecke, 2013) have previously been used as a unidimensional construct. For this reason, a one-factor model of disclosure was first investigated. All disclosure scale items were square root transformed prior to CFA to ensure data normality, as raised levels of kurtosis ( $>.20$ ) were evident for items three and four<sup>4</sup>. A one-factor model produced a poor fit to the data,  $\chi^2$  (54)

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<sup>4</sup> CFA was performed on both untransformed and transformed data. The factor loadings for the Disclosure scale were comparable across the analyses. Model fit was with the normalised data.

= 729.50,  $p < .001$ , CFI = .78, RMSEA = .16 [.15, .17], TLI = .73, SRMR = .01. In order to improve model fit, extensive covariation links (18) between items were added to the model based on the modification indices. The co-varied single factor model was a good fit to the data,  $\chi^2 (34) = 77.61$ ,  $p < .001$ , CFI = .99, RMSEA = .05 [.04, .07], TLI = .97, SRMR = .00, and a significantly better than the original model,  $\Delta\chi^2 (20) = 694.51$ ,  $p < .001$ . Cronbach's alpha indicated good scale reliability ( $\alpha = .90$ ) for all 12-items as a single construct.

It has been suggested that too extensive re-specification of a model can lead to overfitting of the data (Kenny, 2014). The magnitude of the covariation in the one-factor model of disclosure was indicative of over-specification. Inspection of the re-specified co-variances demonstrated clustering of items into two groups, indicating that a two-factor solution might be more appropriate. On this basis, a two-factor model of disclosure was tested. Items were allocated to one of two factors based on their factor loadings and covariant groupings. Items 2, 3, 4, 5, 6, and 9 were assigned to factor 1 (Intimate disclosures) and items 1, 7, 8, 10, 11 and 12 to factor 2 (Common disclosures). Allocation of items to factors was supported by an oblique (direct oblimin) maximum likelihood exploratory factor analysis (EFA) in SPSS. The EFA suggested that a two-factor solution would account for 56.10% of the variance in disclosure, compared to 44.85% for a single factor solution. All items loaded  $>.5$  onto their respective EFA derived factors. There were no cross loadings evident in the EFA. The factor loadings derived from the EFA are provided for comparison with CFA derived loadings in Table A7.2.

*Table A7.2: EFA and CFA derived item loadings for the two-dimensional self-disclosure scale*

Item	EFA		CFA	
	Factor	B [95% BCI]	$\beta$	SE
	Loading			
<i>Factor 1: Common Disclosures</i>				
1. My day to day life	.57	1.00 [1.00, 1.00]	.61***	.05

7. What is important to me in life	.80	1.44 [1.27, 1.67]	.81***	.10
8. What makes me the person I am	.73	1.51 [1.33, 1.75]	.86***	.11
10. Things I have done which I am proud of	.88	1.14 [.99, 1.33]	.64***	.09
11. My close relationships with other people	.60	1.14 [.98, 1.32]	.65***	.09
12. Things that anger me	.54	1.30 [1.13, 1.51]	.72***	.10
<i>Factor 2: Intimate Disclosures</i>				
2. Things I have done which I feel guilty about	.77	1.00 [1.00, 1.00]	.75***	.08
3. Things I wouldn't say or do in public	.79	.97 [.83, 1.12]	.73***	.07
4. My deepest feelings	.82	.99 [.89, 1.11]	.78***	.06
5. What I like and dislike about myself	.68	1.18 [1.07, 1.32]	.84***	.06
6. What I like and dislike about others	.61	1.09 [.96, 1.24]	.72***	.07
9. My worst fears	.65	1.03 [.91, 1.15]	.72***	.06

$\beta$  = standardised; \*\*\* $p < .001$ ;

The CFA derived two-factor model required minimal covariation and provided an adequate fit to the data,  $\chi^2(48) = 185.95, p < .001$ . CFI = .95, RMSEA = .08 [.07, .09], TLI = .93, SRMR = .00. All items loaded strongly ( $>.06$ ; Hair et al., 1998; Field, 2005) onto their respective factors. Cronbach's alpha scale reliability was good for both factors: Common disclosures ( $\alpha = .87$ ) and intimate disclosures ( $\alpha = .88$ ).

The two-factor model of disclosure was a significantly better fit than the original non-modified one-factor model,  $\Delta\chi^2(8) = 592.10, p < .001$ . While it did not demonstrate as good a model fit as the extensively co-varied and re-specified unidimensional construct, it was the preferred option, as it supported the EFA and also provided a solution that was potentially less prone to unstable and biased model estimations (Hoyle, 2014). To achieve a more parsimonious solution and to complement the unidimensional constructs used in prior research, a second-order latent variable “Disclosure” was created to combine the two factors of disclosure. Both factors (common and intimate) loaded significantly ( $p < .001$ ) and strongly ( $>.06$ ) onto the second order factor. The second order two-factor model retained the fit statistics and factor loadings demonstrated by the two-factor model.

### *A7.3 Negative online experiences scale*

CFA for a one-factor model of negative online experiences provided a poor fit to the data,  $\chi^2(9) = 223.66, p < .001$ , CFI = .91, RMSEA = .22 [.20, .25], TLI = .85, SRMR = .09. Multicollinearity between items 1 and 3 was evident ( $r > .08$ ). This was not a surprise as “damaging gossip and rumours” and “critical and hurtful comments” could be construed as measuring a similar facet of social vulnerability. Attempts to resolve this by co-varying the items did not result in a good fit to the data, RMSEA  $> 1.0$ . Item 1 ( $\beta = .89$ ) was therefore removed from the analysis as it had a lower factor loading than item 3 ( $\beta = .91$ ). A re-specified model based on 5 items (Table A7.3) and minor modification indices between items 2 and 3 and items 5 and 6, produced a significantly ( $\Delta\chi^2(6) = 219.05, p < .001$ ) better fit to the data,  $\chi^2(3) = 4.61, p = .203$ , CFI = 1.00, RMSEA = .03 [.00, .08], TLI = 1.00, SRMR = .01. All items loaded strongly onto the latent factor ( $>.06$ ; Hair et al., 1998; Field, 2005). Scale reliability tests indicated good internal consistency for the 5 item scale ( $\alpha = .91$ ).

Table A7.3: CFA derived item loadings for the unidimensional negative online experiences

Item	B [95% BCI]	$\beta$	SE
2. Social embarrassment	1.00 [1.00, 1.00]	.76***	.03
3. Damaging gossip and rumours	1.13 [1.06, 1.22]	.83***	.04
4. Personal information being misused (e.g., shared without permission)	1.18 [1.07, 1.30]	.90***	.04
5. Content of a sexual or violent nature	1.04 [.93, 1.15]	.77***	.05
6. Unwanted advances, stalking or harassment online	.94 [.83, 1.096]	.77***	.05

$\beta$  = standardised; \*\*\* $p < .001$

#### A7.4 Self-esteem scale

There have been debates in the literature about the factor structure of the self-esteem scale. The original structure for which it was designed demonstrated a one-factor solution of overall self-esteem. Arguments for a two-factor model have been made (Greenberger, Chen, Dmitrieva, & Farruggia, 2003; Tomas & Oliver, 1999), however, researchers have been quick to point out that the two factors are generally a bi-product of the scale's positively and negatively worded items, resulting in factors of positive and negative self-esteem. For the purposes of this research, a one-factor model of self-esteem was first investigated. Initial CFA demonstrated a poor fit to the data,  $\chi^2 (35) = 838.35$ ,  $p < .001$ , CFI = .69, RMSEA = .22 [.20, .23], TLI = .60, SRMR = .09. In order to improve model fit, covariation between items was included based on modification indices. Covariation was extensive and mirrored the positive/negative wording of the items. The co-varied model was a significantly better fit to the data,  $\chi^2 (24) = 31.13$ ,  $p = .15$ , CFI = 1.00, RMSEA = .03 [.00, .05], TLI = 1.00, SRMR =



.01. However, the recoded negative self-esteem items all loaded much lower (<.45) than the positively worded items (>.07).

The pattern of covariation between the items and the low factor loadings for negatively worded items was suggestive of a two-factor model for this dataset. A two-factor model was therefore tested with positively worded items in factor 1 (items 1, 3, 4, 7, and 10) and negatively worded items in factor 2 (items 2, 5, 6, 8, and 9). EFA in SPSS was once again used to check the factor structure for the two-factor model prior to CFA analysis. The EFA demonstrated that the two-factor model accounted for 60.28% of the variance of self-esteem, as opposed to 44.11% for a one-factor model. EFA factor loadings supported the use of positive and negative factors. EFA and CFA derived factor loadings are presented in Table A7.4.

*Table A7.4: EFA and CFA derived item loadings for the two-dimensional Self-Esteem scale*

Item	B [BCI]	$\beta$	SE
<i>Factor 1 – Positive Self-Esteem</i>			
1. On the whole, I am satisfied with myself	1.00 [1.00, 1.00]	.79***	.07
3. I feel that I have a number of good qualities	.94 [.83, 1.06]	.83***	.06
4. I am able to do things as well as most other people	.83 [.69, .97]	.71***	.07
7. I feel that I'm a person of worth	.96 [.85, 1.07]	.77***	.06
10. I take a positive attitude toward myself	1.03 [.92, 1.16]	.78***	.06
<i>Factor 2 – Negative Self-Esteem</i>			
2. At times I think I am no good at all	1.00 [1.00, 1.00]	.80***	.08
5. I feel I do not have much to be proud of	.78 [.68, .87]	.71***	.05

6. I certainly feel useless at times	1.03 [.95, 1.12]	.85***	.05
8. I wish I could have more respect for myself	.82 [.72, .91]	.69***	.05
9. All in all, I am inclined to think that I am a failure	.97 [.87, 1.07]	.85***	.05

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$\beta$  = standardised; \*\*\* $p < .001$

The CFA derived two-factor model was a good fit to the data,  $\chi^2 (33) = 58.33, p < .001$ , CFI = .99, RMSEA = .04 [.04, .06], TLI = .99, SRMR = .01. All items in the two-factor model loaded strongly ( $>.06$ ; Hair et al., 1998; Field, 2005) onto their respective factors. Cronbach's alpha scale reliability was good for both factors: positive self-esteem ( $\alpha = .88$ ) and negative self-esteem ( $\alpha = .88$ ).

While the co-varied one-factor model was a significantly better fit to the data than the two-factor solution,  $\Delta\chi^2 (9) = 27.20, p < .001$ , the heavy reliance on modification indices and the low factor loadings for the five negatively worded items provided good grounds for selecting the two-factor model. However, in light of concerns raised in the literature regarding the use of two separate factors of self-esteem (McKay, Boduszek, & Harvey, 2014), a model using a second order latent variable, 'Self-Esteem,' linking the two factors (positive and negative) was also tested. The model retained the fit statistics and factor loadings demonstrated by the two-factor model, but with the added benefits of increasing model parsimony and providing a more theoretically sound single construct. The positive and negative latent variables loaded significantly onto the second order latent variable ( $\beta = .52$ ).

#### A7.5 PPV scale

CFA for a one-factor model of the PPV scale provided a poor fit to the data,  $\chi^2 (35) = 488.38, p < .001$ , CFI = .92, RMSEA = .16 [.15, .18], TLI = .89, SRMR = .08. Multicollinearity was evident with high correlations ( $r > .8$ ) between items 1 and 2 (data misuse), 3 and 4 (conflicts

with friends and family), and 5, 8, and 9 (future vulnerability). This was plausible given the salient overlap in the theme and language used in each set of questions. Attempts to resolve this by co-varying the items did not result in a good fit to the data ( $RMSEA > 1.0$ ). A review of the coefficient values and model-fit suggested that items 2, 4, 5, and 9 should be removed from the analysis. A re-specified model based on 6 items (Table A7.5) and minor modification indices between items 1 and 10 and items 6 and 10, produced a significantly,  $\Delta\chi^2 (28) = 462.85$ ,  $p < .001$ , better fit to the data,  $\chi^2 (7) = 25.53$ ,  $p = .001$ , CFI = .99, RMSEA = .07 [.04, .10], TLI = .98, SRMR = .03. All items loaded strongly onto the latent factor ( $>.06$ ; Hair et al., 1998; Field, 2005). Scale reliability tests for PPV indicated good internal consistency for the 6-item scale ( $\alpha = .94$ ).

*Table A7.5: CFA derived item loadings for the unidimensional PPV scale*

Item	B [95% BCI]	$\beta$	SE
1. Be misused by others	1.00 [1.00, 1.00]	.83***	.05
3. Cause conflicts with my family	1.08 [1.01, 1.16]	.84***	.04
6. Attract unwanted attention from strangers	1.16 [1.09, 1.25]	.88***	.04
7. Be judged unfairly by others	1.06 [.99, 1.14]	.88***	.04
8. Make you regretful in the future	1.15 [1.04, 1.20]	.88***	.04
10. Be seen by people you do not know	.939 [.86, 1.02]	.76***	.04

$\beta$  = standardised; \*\*\* $p < .001$

#### *A7.6 TPV scale*

A one-factor model of the TPV scale provided a poor fit to the data,  $\chi^2 (35) = 405.46$ ,  $p < .001$ , CFI = .92, RMSEA = .15 [.14, .16], TLI = .90, SRMR = .07. As previously found in the PPV scale, multicollinearity was evident with high correlations ( $r > .08$ ) between items 1 and 2 (data misuse) and 3 and 4 (conflicts with friends and family). As the aim of the TPV scale was

to provide a direct comparison with the PPV scale, parallel item composition was preferred. On this basis, a modified CFA complementing the final CFA structure of the PPV scale was tested, with items 2, 4, 5, and 9 removed. The re-specified model based on 6 items (Table A7.6) produced a significantly,  $\Delta\chi^2(17) = 371.77, p < .001$ , better fit to the data,  $\chi^2(9) = 33.69, p = .001$ , CFI = .99, RMSEA = .08 [.05, .10], TLI = .98, SRMR = .03. All items loaded strongly onto the latent factor ( $>.06$ ; Hair et al., 1998; Field, 2005). Scale reliability tests for TPV indicated good internal consistency for the 6-item scale ( $\alpha = .93$ ).

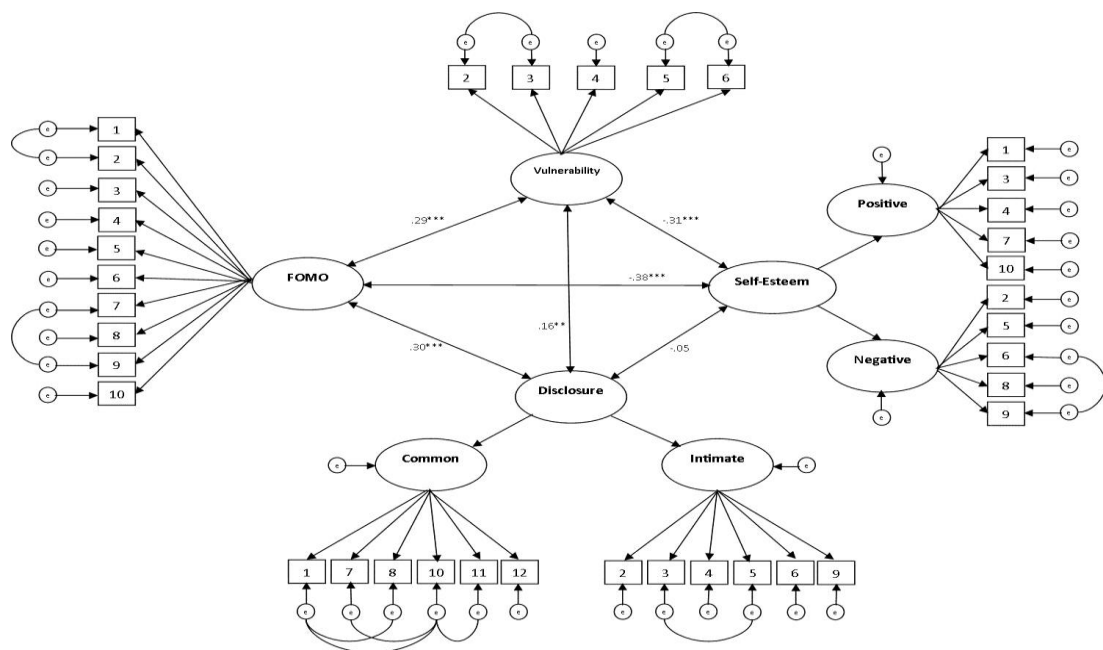
*Table A7.6: CFA derived item loadings for the unidimensional TPV scale*

Item	B [95% BCI]	$\beta$	SE
1. Be misused by others	1.00 [1.00, 1.00]	.77***	.04
3. Cause conflicts with my family	1.07 [.97, 1.17]	.79***	.05
6. Attract unwanted attention from strangers	1.25 [1.16, 1.36]	.89***	.05
7. Be judged unfairly by others	1.11 [1.02, 1.21]	.87***	.05
8. Make you regretful in the future	1.11 [1.02, 1.22]	.86***	.05
10. Be seen by people you do not know	1.06 [.97, 1.16]	.79***	.05

$\beta$  = standardised; \*\*\* $p < .001$

## Appendix 8: chapter 4 SEM preparation

Prior to the SEM path analysis an overall measurement model, combining all CFA derived latent variables (self-esteem, FOMO, self-disclosure and negative online experiences) was tested to ensure all latent factors provided an appropriate fit to the data. All items loaded onto their corresponding factors significantly (all  $p < .001$ ). Model fit statistics were compared against recommended values for CFI, RMSEA, TLI, and SRMR as described in Chapter 3 (see Section 3.6.1.4.2. p. 144). The full measurement model (Figure A8.1) provided a just acceptable fit to the data,  $\chi^2(605) = 1280.76$ ,  $p < .001$ , CFI = .94, RMSEA = .05 [.06, .07], TLI = .93, SRMR = .02



Key: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; ^ $p = .05$

Figure A8.1: Latent measurement model

The model contained 93 distinct parameters, which created a parameter to sample ratio of approximately 1:5. CFA literature recommends that robust, well-fitted models should ideally have a ratio no lower than 1:5, and ideally be in the region of 1:10 (Schwab, 1980).

Considering the mediocre fit and just adequate sample-parameter ratio demonstrated, an alternative model using item parcelling was explored.

When dealing with multiple latent variables, the inclusion of individual item terms can create complex, parameter heavy models, which can reduce the participant to parameter ratio. A possible solution is to utilise item parcelling. Parcelling is a procedure in which individual scale items are combined and used as the observed variables for a latent factor. Parcelling can improve the parameter to sample ratio, thus reducing sample size estimation bias (Little, Rhemtulla, Gibson, & Schoemann, 2013). Further, it can remedy minor discrepancies in data distribution and reduce the reliance on item covariation (Little et al., 2013).

It should be noted that parcelling items is a much-debated topic within the realms of social sciences research. Despite the apparent merits of such methods, concerns about potential information loss and the use of inappropriate factor structures abound (Bandalos & Finney, 2001; Matsunaga, 2008). To counter such arguments, it has been suggested that parcelling is less problematic when significantly loading items and factor structures have been determined previously by CFA (Kenny, 2014; Little et al., 2013).

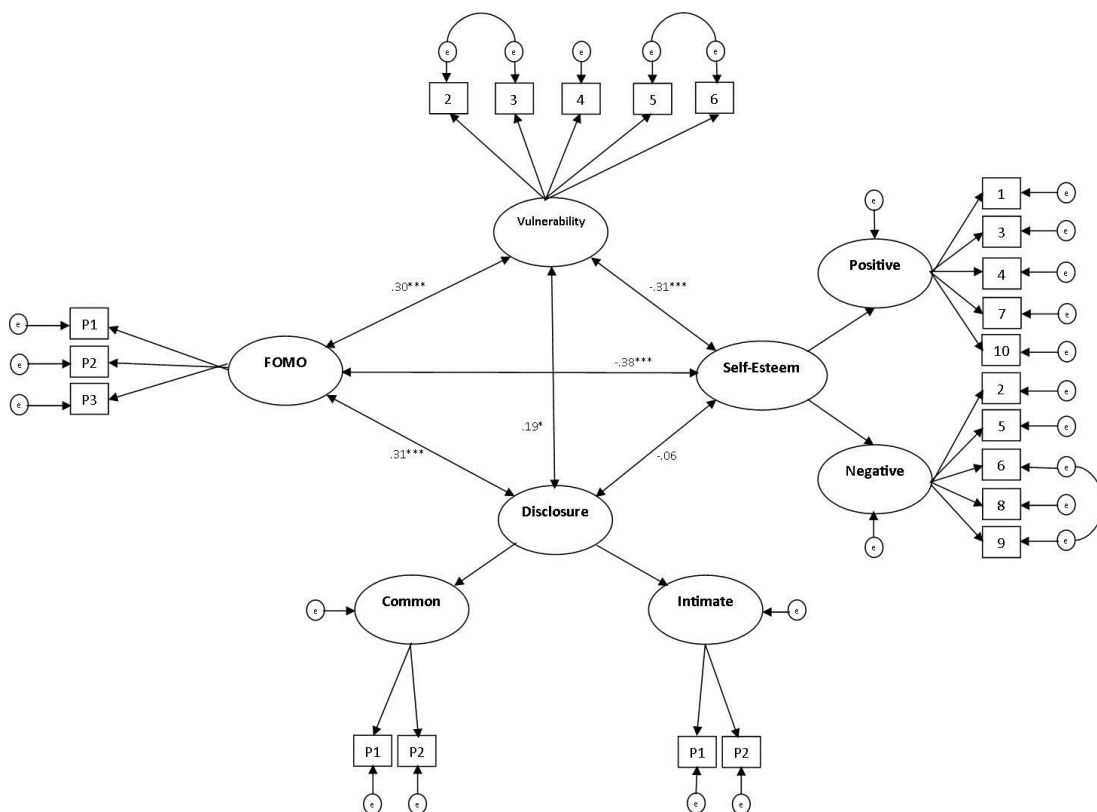
For this study, latent factors with more than five items (FOMO and both Disclosure factors) and mediocre fit were parcellled. Vulnerability and Self-Esteem already demonstrated good fit with only five items per factor. Parcellled items were determined by using the strength of factor loadings derived from initial CFA analysis (see Chapter 3 Section 3.6). Items were ranked according to their factor loading and then distributed sequentially across a minimum of two parcels per factor (Kenny, 2014). The sum of items for each parcel was then calculated.

Two parcels were created for each of the Disclosure factors and three parcels for the FOMO scale. The items and their corresponding parcels are shown in Table A8.1.

Table A8.1: Item parcels for the FOMO and Disclosure scales

	Parcel 1 Items	Parcel 2 Items	Parcel 3 Items
FOMO	1, 4, 7, and 10	2, 5, and 8	3, 6, and 9
Common	8, 11, and 12	1, 7, and 10	
Disclosures			
Intimate Disclosures	2, 5, and 9	3, 4, and 6	

Following this procedure, CFA was run on the parcelled measurement model to determine goodness of fit. All parcels loaded significantly onto their corresponding latent factors (all  $p < .001$ ), with no covariation required between item parcels. Coefficient weights and the pattern of significance (Figure A8.2) complimented the findings from the non-parcelled model (Figure A8.1).



Key: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Figure A8.2: Parcelled latent measurement model

The total number of distinct parameters for the parcelled model was 54, producing a more acceptable 1:9 item to sample ratio. The model fit for the parcelled measurement model (Figure A8.2) was excellent,  $\chi^2 (199) = 348.19$ ,  $p < .001$ , CFI = .98, RMSEA = .02 [.03, .05], TLI = .97, SRMR = .04, and a significant improvement,  $\Delta\chi^2 (406) = 932.57$ ,  $p < .001$ , on the fit demonstrated for the original measurement model (Figure A8.1).



## **Appendix 9: declaration of collaborative work**

Elements presented in the current thesis have been partly presented in/based on articles published in academic journals.

### ***Empirical chapters 4 and 5:***

Buglass, S. L., Binder, J. F., Betts, L. R., & Underwood, J. D. (2017a). Motivators of online vulnerability: The impact of social network site use and FOMO. *Computers in Human Behavior*, 66, 248-255. doi: 10.1016/j.chb.2016.09.055

### ***Empirical chapters 7 and 8:***

Buglass, S. L., Binder, J. F., Betts, L. R., & Underwood, J. D. (2016). When ‘friends’ collide: Social heterogeneity and user vulnerability on social network sites. *Computers in Human Behavior*, 54, 62-72. doi: 10.1016/j.chb.2016.09.055

### ***Empirical chapter 9:***

Buglass, S. L., Binder, J. F., Betts, L. R., & Underwood, J. D. (2017b). Looking for trouble: A multilevel analysis of disagreeable contacts in online social networks. *Computers in Human Behavior*, 70, 234-243. doi:10.1016/j.chb.2016.12.078

### ***Contribution of first author (Sarah L. Buglass):***

- Initiation of independent research
- Development of key research ideas
- Data collection
- Data cleaning
- Data analysis
- Write-up (all text, tables and figures)
- Implementation of co-authors’ feedback

***Declaration of Co-Author Contribution:***

The content of the chapters presented in the thesis reflect the original and independent work completed by the first author (Sarah L. Buglass). Input from the additional co-authors was provided in the form of general feedback / guidance, in line with the normal working expectations of a PhD Student – Supervisor relationship.

No original content in the thesis or accompanying journal articles was produced by any co-authors listed.